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THE WATERPROOFING HANDBOOK

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The General Fireproofing Co.
YOUNGSTOWN - OHIO



THE WATERPROOFING HANDBOOK

(SIXTH EDITION)

Describing effective and economical methods for waterproofing concrete and all forms of masonry both above and below grade; for preserving decorative effects, exterior and interior; for protecting finished surfaces, whether wood, plaster, concrete or metal against water, wear and stains by the use of GF Waterproofings and Preservatives



The General Fireproofing Company
Youngstown, Ohio

SYRACUSE CHICAGO BOSTON MILWAUKEE KANSAS CITY MINNEAPOLIS ST. LOUIS OMAHA
SAN FRANCISCO ATLANTA PHILADELPHIA NEW YORK CLEVELAND LOS ANGELES

Export Department, 438 Broadway, New York City, Cable Address — "Genfire New York"

Printed in U. S. A. 310-1

STUDY GROUP

RESEARCHER



New Hotel Statler, Buffalo, N. Y. 26,000 pounds of GF Integral Waterproofing Paste (GF 10) used in the foundation footings of this new building. Architects, Geo. B. Post & Son, New York City. Contractors, Masten Construction Company, New York.

431-102831-148 DT
ID 84-13201-10F

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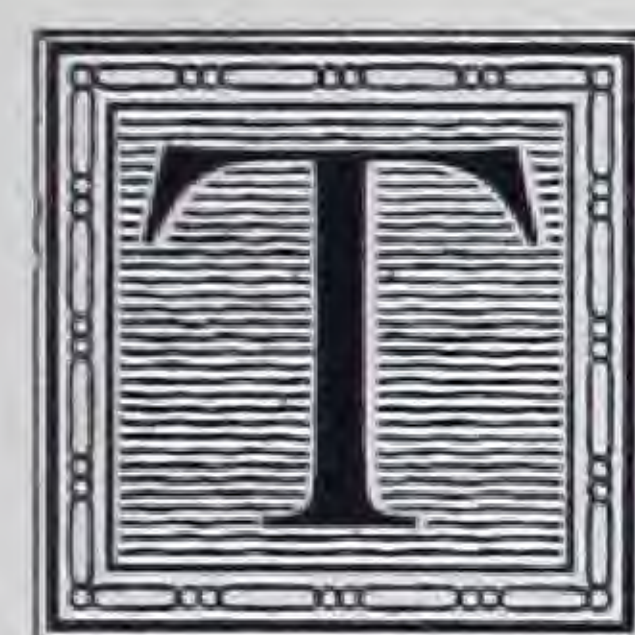
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THE GENERAL FIREPROOFING COMPANY, YOUNGSTOWN, OHIO

Waterproofing Methods and Materials



THROUGH all ages water has been the great agent of disintegration. Falling as rain in the higher altitudes, it seeps into fissures and freezing, rends solid rock, pulverizing it into its mineral constituents. Erosion follows and the spring freshet carries down to lower levels the loose particles of sand and clay which once formed mountain ranges. The soil under our feet has been formed from solid rock by this disintegrating effect of water.

Water tears down mountains of granite, carves out the deep canyon and in the end reduces the inequalities of the earth's surface to the basic level of the sea.

The structural creations of man likewise become its prey and in a comparatively short space of time are rendered unfit for human habitation or commercial use. To combat the destructive action of water and prolong the life of what he builds, man resorts to extensive drainage systems and fortifies exposed surfaces of buildings with water repelling materials.

The destructive action of water on concrete and masonry is well known to every architect and engineer. Through the absorption of water containing acids from the soil and atmosphere the cementing materials of concrete and masonry are attacked and the structure in time crumbles to pieces.

Added to the destruction of the building itself is the deleterious effect on its contents.

The necessity for waterproofing is especially felt in business sections of large cities, where high real estate values and the isolated power plants of large office buildings make deep basements a necessity.

Frequently the floors of such basements are much below the established drainage levels and the walls are consequently subjected to considerable hydrostatic pressure from without, especially in cases of leaks in water mains or sewers.

Except in actual deserts all soil contains at least 2% of moisture, which in time of rains or leakage from sewers or water mains is considerably increased, and even though the soil appears dry at the time the excavation is made, it is no indication that the basement walls and floors will not be damp.

Dampness is insanitary, harmful to health and conducive to the propagation of vermin and decay. It is detrimental to stored goods and in extreme cases interferes with the proper operation of the power and auxiliary equipment housed in the basements of office buildings and stores.

Although the subject of waterproofing is most frequently considered in connection with foundation work and structures in actual contact with water, the necessity for waterproofing concrete and other construction exposed to the weather is equally important, as a preventive of both deterioration and discoloration.

Exteriors of all structures exposed to the weather should be dampproofed. Rain water penetrates the surface, freezes and causes cracks and spalls which rapidly enlarge

to the detriment and ultimate destruction of the surface. Soot and dust collecting on the surface are carried in by the rain causing stains and discolorations that cannot be removed.

The correct solution of any waterproofing problem depends upon the conditions that prevail, and the methods and materials to be used should fit these conditions. In waterproofing below grade where hydrostatic pressure is encountered, one of two general methods may be employed. The exposed face of the wall and floor may be protected from the intrusion of water by the application of a treated membraneous covering enclosing the entire sub-structure. This method calls for considerable engineering and mechanical skill and close supervision.

The alternative method, and a very workable one even with ordinary labor, is the integral method by which the concrete itself is rendered impervious to water.

The dampproofing of stucco walls is best accomplished during construction by waterproofing the finish coat. Where the necessity for weatherproofing develops after the building has been completed, a brush coating either colorless to preserve the original texture, or tinted to give a new and pleasing finish, may be used.

Concrete floors are treated in various ways to render them water and acidproof, or to give them a hard and dustproof finish that effectively stops wear and erosion caused by traffic and heavy trucking.

The additional cost of waterproofing basements and exteriors, protecting floors from abrasion, dry rot, action of acids, oils and fumes is so small a part of the total cost of the building (1% to 2%) as to be almost negligible compared to the greater durability, improved appearance and increased satisfaction that results. The amount spent in original waterproofing is frequently saved annually in reduced repair bills and lowered depreciation of the structure.

On the following pages are described methods and materials for the solution of the more common waterproofing problems. In some instances the problem will call for a combination of methods and the use of two or more materials.

Where unusual problems are encountered for which no specific solution is given, the service of our Waterproofing Engineering Department is available for consultation and assistance.

In addition to the strictly waterproofing materials and their applications, there is included a variety of other products including a cement accelerator, technical paints for the protection of structural steel and galvanized surfaces, wood floor preservatives and stainproof backings for brick and stone facings.

Complete specifications are given for the proper application of all GF materials listed with detail drawings of correct practice for the more complex problems.

For the convenience of the reader the book is divided into four sections each dealing with related problems. Section I treats of Sub-Structural Waterproofing, Section II of Dampproofing and Decorating for Super-Structural Walls and Roofing, Section III of Floor Treatments, and Section IV of the various Technical Paints and Protective Coatings for masonry, structural steel and other surfaces.

The experience of GF Waterproofing Engineers extends over a period of many years and embraces every phase of waterproofing problems. The benefit of this experience is at your service.

SECTION I—The Waterproofing Handbook

SUB-STRUCTURAL WATERPROOFING

Methods and Materials for the Waterproofing of Foundations, Basements, Pits, Tanks, Pools, Containers and other Structures subjected to Hydrostatic Pressure or Dampness. With Specifications for the use of the Waterproofing Agents, GF 10, GF 11, GF 12, GF 16, GF 17, GF 18, GF 21 and GF 250.



The General Fireproofing Company
Youngstown, Ohio

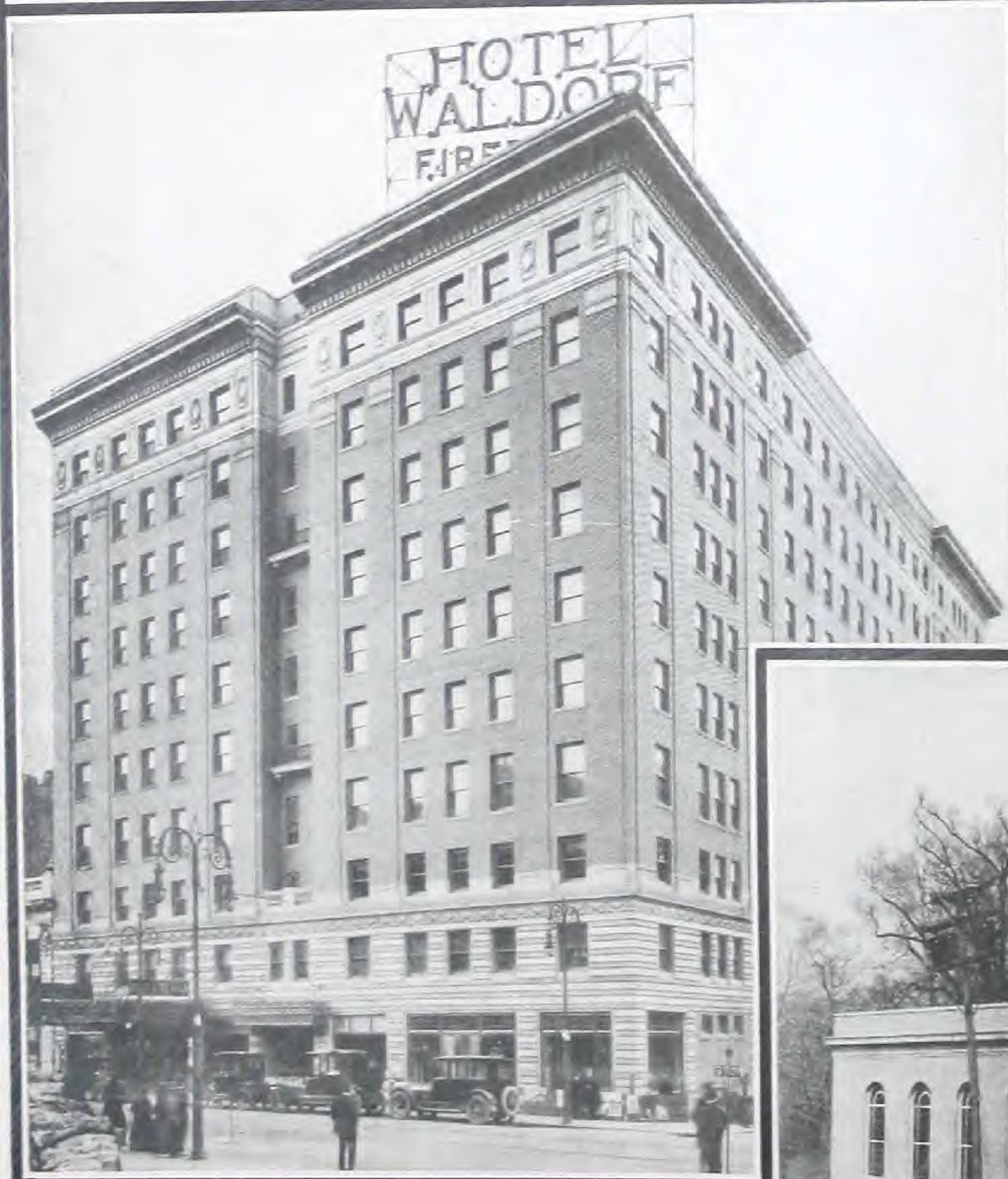
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Export Department, 438 Broadway, New York City. Cable Address "Genfire New York".

Printed in U. S. A. A 326-6



Rowland Building, Columbus, Ohio. GF Integral Waterproofing Powder (GF 11)
Architect, C. L. Inscho



Waldorf Hotel, Toledo, Ohio. GF Trowel Coating (GF 250), GF Foundation Brush Coating (GF 16), and GF Bitumen Mop Coating (GF 17) used. Architect, Thomas F. Huber, Toledo. Contractor, H. J. Spieker Co., Toledo.

Masonic Home Power House, Springfield, Ohio. GF Foundation Brush Coating (GF 16) used. Architect, Richards, McCarthy & Bulford, Columbus, Ohio. Contractor, Cullen & Vaughn Co., Springfield.



S U B - S T R U C T U R A L W A T E R P R O O F I N G

Specification Guide

Sub-structural Waterproofing

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Waterproofing by the Integral Method

IN waterproofing concrete by the integral method the concrete itself is rendered impervious to water by the incorporation, within the mass, of a water repellent material that becomes an *integral* part of the concrete.

The difficulty of making concrete waterproof without the addition of a waterproofing compound is largely due to the impossibility of following laboratory methods in the field. The materials of which commercial concrete is formed must necessarily vary greatly on different jobs, even with careful grading, and all of the aggregates are themselves more or less porous and absorb water readily. Coupled with this is the difficulty of getting a sufficiently uniform density throughout the mass with the help that is available for this class of work.

There are two general methods for waterproofing concrete by the integral method. One method is the use of a waterproofing powder (GF 11) which is mixed dry with the cement before placing in the mixer. The second method makes use of a waterproofing paste (GF 10) which is dissolved in the gauging water before the same is added to the mix.

The paste method is the one in most common use and is the method that is most workable under the ordinary construction conditions.

The compressive strength of concrete waterproofed by the integral method, increases with age over that of unwaterproofed concrete. Lime and similar inert fillers decrease the compressive strength in direct proportion to the quantities used.

Reinforced Concrete Slabs for Walls and Floors

Strength Required to Resist Water Pressure

In waterproofing reinforced concrete walls and floors that are subjected to a hydrostatic head, it is necessary that the wall or floor be strong enough to resist the water pressure, for the waterproofing itself is not counted upon as a structural element.

This design can be made very accurately where the hydrostatic head, or depth of the water, is known, but this is often hard to determine—especially in the case of foundations and cellars of buildings. These are, in nearly all cases, banked with earth which in dry weather contains no water but which may become saturated at the time of rainstorms and floods.

The hydrostatic head to be used in designing tanks, reservoirs and dams is definitely known and must be taken at its full value in accordance with the well known laws of hydrostatic pressure, but the tendency in designing the floors and walls of cellars is to assume a hydrostatic head entirely too large for the existing conditions, with a consequent needless expenditure of money.

Every foundation and basement floor should, if possible, be constructed with a good drainage system to relieve the water pressure to the extent that the hydrostatic head may be computed at about 50% of the maximum. Where the drainage system is liable to become clogged or in cases of actual constant water pressure the maximum pressure must be considered.

Retaining walls for earth pressure are often designed to resist the pressure of a fluid of one-half the density of water, and this is a safe rule to follow in designing walls for basements located in any but swampy ground. In cases of actual constant water pressure the walls should be designed in layers one foot in height each calculated to resist the water pressure to which it will be subjected.

Position of Reinforcing Steel

In reinforced concrete slabs the reinforcing steel is placed to resist tension stresses—and the concrete, which is weak in tension, is designed to resist compression stresses.

Where concrete walls are used to resist water pressure and the walls are of simple design, having horizontal reinforcement only, the reinforcing steel is placed near the surface on the side opposite the water pressure.

In the floors of a building the loads are placed upon the upper surface of the slabs and the reinforcing steel is placed near the under side of the slab. In the case of basement floors, however, designed to resist water pressure from beneath, the position of the reinforcing steel is reversed, i. e., it is placed near the top of the slab.

To find the pressure exerted by a given head of water, multiply the head in feet by 62.5 pounds. Thus, a 10-foot head of water will exert a pressure of 625 pounds per square foot.

Explanation of Table 1

Reinforced Concrete Slabs for Walls Horizontal Water Pressure

The table of Reinforced Concrete Slabs for Walls (Table 1), is a table of Total Loads per square foot that can be safely resisted by slabs of various spans and thicknesses with different amounts of steel reinforcement. It is used in the design of walls, constructed as reinforced concrete slabs with vertical supports (or buttresses) at stated intervals, and in which the reinforcement runs horizontally between supports.

To illustrate the use of this table we will consider as a slab a section of wall having vertical supports 12' apart and on the other side of the wall—water 10' deep.

It is evident that the pressure against this wall varies from a maximum at the bottom, or deepest point, to nothing at the top. Consequently, the wall must be strong enough to resist the maximum pressure at the bottom and the strength may

be gradually decreased toward the top. If the wall is considered as made up of successive horizontal layers or laminations one foot deep and each layer designed to resist the pressure of the water at that depth, the result will be a design that is safe and economical.

Consider first the bottom layer, 1 foot high. The mean depth of water on the face of this layer is $9\frac{1}{2}'$. The pressure of the water is $9\frac{1}{2} \times 62\frac{1}{2} = 593\frac{3}{4}$ pounds and the bottom section must therefore be designed to resist that pressure.

In Table 1 find the span 12 feet (the distance between supports) in the column headed "Clear Span in Feet." Opposite this on the same horizontal line, we find under the vertical column "Total Thickness of Slab" that an 11" slab has a strength of 590 pounds per square foot and while the actual pressure exerted is about 4 pounds greater than this, we can use this slab with safety.

In the same vertical column opposite "Area of Steel per Foot of Width" we find that .81 square inches of reinforcing steel is required per foot width of slab. And opposite "Effective Depth of Slab" we find that this steel must be placed 9" from the water face of the wall.

The proper design is a wall built up after the manner described for the bottom layer, considering the exact water pressure to which each layer or step is subjected, and in foundations for buildings, the weight of the superstructure it must support. For all practical purposes in connection with small work, however, the usual method is to design the wall of a uniform thickness sufficient to take the maximum pressure.

Table No. 1

Reinforced Concrete Slabs for Walls														
Safe Loads in Pounds per square foot														
Total Thickness of Slab	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	
Effective Depth of Slab	3"	4"	5"	6"	6½"	7½"	8"	9"	10"	11"	12"	13"	14"	
3	1050	1865	2910	4210	4940	6580	7480							3
4	592	1050	1620	2360	2780	3690	4200							4
5	377	670	1050	1510	1775	2350	2680	3400	4200					5
6	262	467	730	1050	1230	1640	1865	2360	2920					6
7	193	344	535	770	905	1205	1370	1740	2140	2590	3080			7
8	148	262	410	590	695	923	1050	1330	1640	1990	2360	2770	3220	8
9	116	207	324	467	547	730	830	1050	1295	1570	1870	2200	2540	9
10		168	262	377	447	590	670	850	1050	1270	1510	1780	2060	10
11			139	216	312	486	555	702	870	1050	1245	1465	1700	11
12				182	262	306	408	465	590	728	885	1050	1215	12
13				154	222	261	348	395	500	620	750	890	1050	13
14				134	193	226	300	342	433	535	650	770	905	14
15					167	196	262	298	377	465	565	670	790	15
16					147	173	230	262	332	408	495	590	692	16
17					130	153	203	232	294	363	440	520	615	17
18						136	181	206	261	323	391	465	545	18
19							162	185	235	290	350	417	490	19
20								168	212	262	318	378	445	20
Weight of Slab per sq. foot	50	63	75	88	100	113	125	138	150	163	175	187	200	
Area of Steel per foot width	.27	.36	.45	.54	.585	.675	.72	.81	.90	.99	1.079	1.17	1.26	

Explanation of Table 2

Reinforced Concrete Slabs for Floors— Upward Water Pressure

In reinforcing floors against a water pressure, the reinforcing steel must be placed near the top of the slab.

The table of Reinforced Concrete Slabs for Floors (Table 2) shows the total thickness of slab, the amount of reinforcing steel required and the distance from the water face of the slab to the center of the reinforcing. It considers reinforcing as placed in one direction only.

To illustrate, we will take the case of a floor slab with supports 15' apart, subjected to a pressure caused by a 7' head of water. The pressure, or in this case, the lifting power of the water, is $7 \times 62\frac{1}{2} = 437\frac{1}{2}$ pounds per square foot.

Find the span 15' in the column "Clear Span in Feet" in Table 2. Opposite this and on the same horizontal line we find under the column "Total Thickness of Slab" that an 11" slab will resist a water pressure of 515 pounds per square foot, while the actual lifting power of a 7' column of water is only $437\frac{1}{2}$ pounds per square foot.

In the same vertical column opposite "Area of Steel per Foot of Width" we find that .81 square inches of reinforcing steel is required per foot

width of slab. And opposite "Effective Depth of Slab" we find that this steel must be placed 9" from the bottom face of the slab.

As the water pressure is the same over the entire floor, the thickness of the slab and the amount of reinforcing steel will be the same at every point.

The safe pressure loads, given in Table 2, include the weight of the slab.

Table No. 2

Reinforced Concrete Slabs for Floors														
Safe Loads in Pounds per square foot														
Total Thickness of Slab	4"	5"	6"	7"	8"	9"	10"	11"	12"	13"	14"	15"	16"	
Effective Depth of Slab	3"	4"	5"	6"	6½"	7½"	8"	9"	10"	11"	12"	13"	14"	
3	1100	1928	2985	4298	5040	6693	7605							3
4	642	1113	1695	2448	2880	3803	4325							4
5	427	733	1125	1598	1875	2463	2805	3538	4350					5
6	312	530	805	1138	1330	1753	1990	2498	3070					6
7	243	407	610	858	1005	1318	1495	1878	2290	2753	3255			7
8	198	325	485	678	795	1036	1175	1468	1790	2153	2535	2957	3420	8
9	166	270	399	555	647	843	955	1188	1445	1733	2045	2387	2740	9
10		231	337	465	545	703	795	988	1200	1433	1685	1967	2260	10
11		202	291	400	465	599	680	840	1020	1213	1420	1652	1900	11
12			257	350	406	521	590	728	878	1048	1225	1402	1620	12
13			229	310	361	461	520	638	770	913	1065	1237	1420	13
14			209	281	326	413	467	571	685	813	945	1092	1250	14
15				255	296	375	423	515	615	728	845	977	1115	15
16				235	273	343	387	470	558	658	765	879	1002	16
17				218	253	316	357	432	513	603	695	802	910	17
18					236	294	331	399	473	554	640	732	835	18
19						275	310	373	440	513	592	677	768	19
20							293	350	412	481	553	632	715	20
Weight of Slab per sq. foot	50	63	75	88	100	113	125	138	150	163	175	187	200	
Area of Steel per foot width	.27	.36	.45	.54	.585	.675	.72	.81	.90	.99	1.079	1.17	1.26	

GF Integral Waterproofing Paste (GF 10)

GF Integral Waterproofing Paste (GF10) is a soluble compound of a consistency about equal to that of soft butter. It readily enters into complete solution with the gauging water. When this solution is added to the concrete the dissolved paste enters into chemical combination with the lime of the cement forming, as the concrete sets, a highly water repellent compound thoroughly distributed throughout the mass which effectively seals the pores against the penetration of all moisture.

GF 10 has been used for the purpose of integral waterproofing for years. The object of the inventor in developing this paste was to secure perfect distribution of a water repellent substance throughout the concrete.

To produce this result, GF 10 acts in two ways: First, it imparts to the gauging water a high lubricating value, thereby reducing the amount of water necessary and producing a denser concrete with minimum voids. Second, it forms a permanent and insoluble film over the surfaces of these voids, making them water repellent.

To understand how the lubricating properties of GF 10 add to its waterproofing qualities, we must

first thoroughly understand just what the function of water is in the formation of concrete and how it is affected by the introduction of the waterproofing paste.

Recent studies of concrete by Professor Duff Abrams of the Lewis Institute, Chicago, indicate that the gauging water used in mixing concrete has two functions: First, to flush into place all the particles of sand, rock and cement used in mixing the concrete, and second, to combine with Portland cement in the setting process.

The first function, the flushing of materials into place, requires a somewhat greater amount of water than does the second. As a result, after the concrete has set, there is left in the pores of the concrete a residue of water which was necessary for the flushing process, but which has not been absorbed by the cement. As this excess water evaporates, voids remain which leave the concrete porous and water-thirsty.

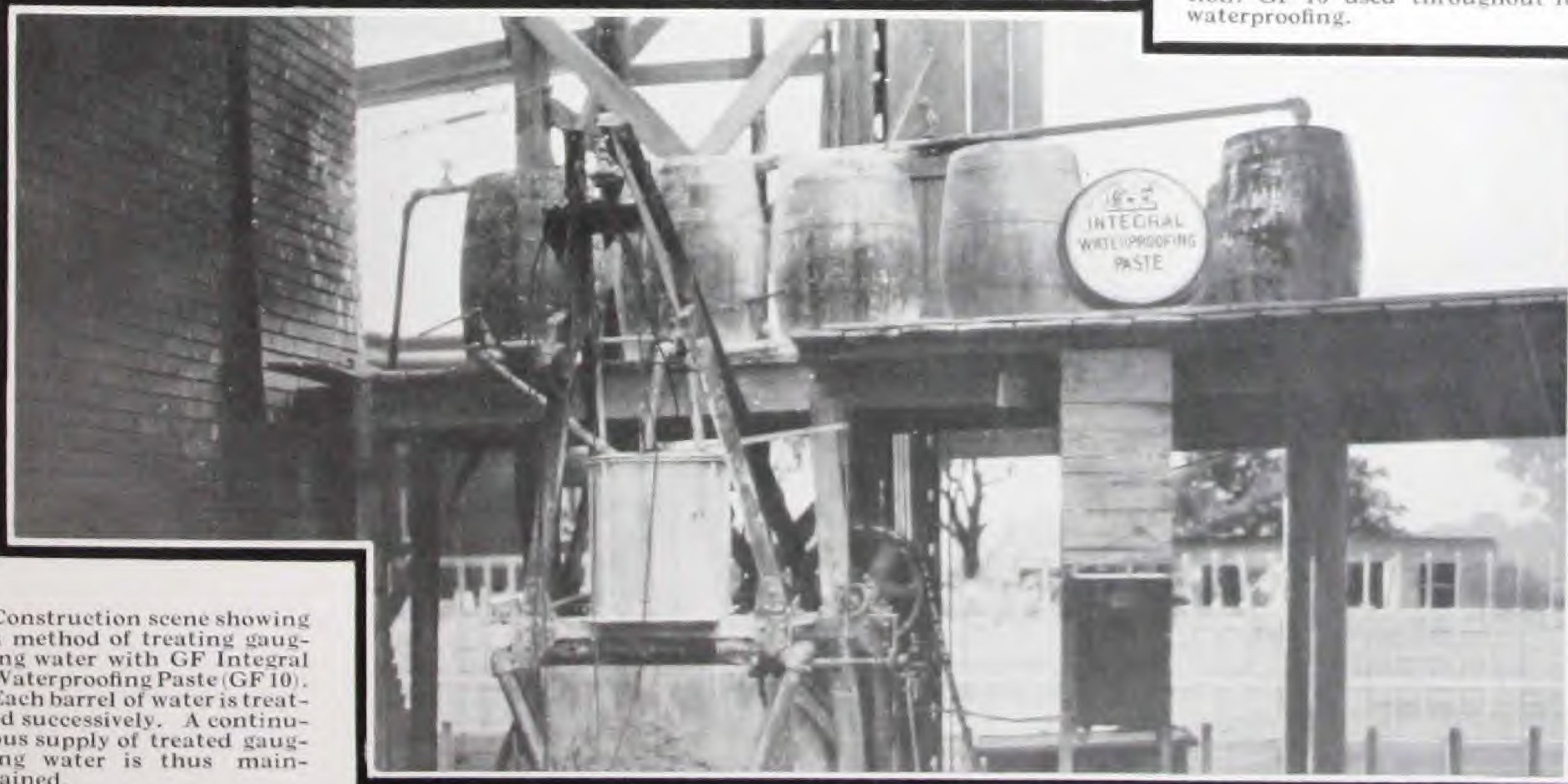
It is the nature of GF 10 to act as a lubricant when mixed with the gauging water. For this reason the flushing process is greatly facilitated and a smaller quantity of water is necessary. With a smaller amount of water used there is a smaller

(Continued on page 16)

Below, Water-treating storage tanks of Oliver Iron & Steel Co., Pittsburgh. GF 10 used to waterproof concrete. Engineers, Wm. B. Scaife & Sons. Contractors, Cuthbert Bros. Co.



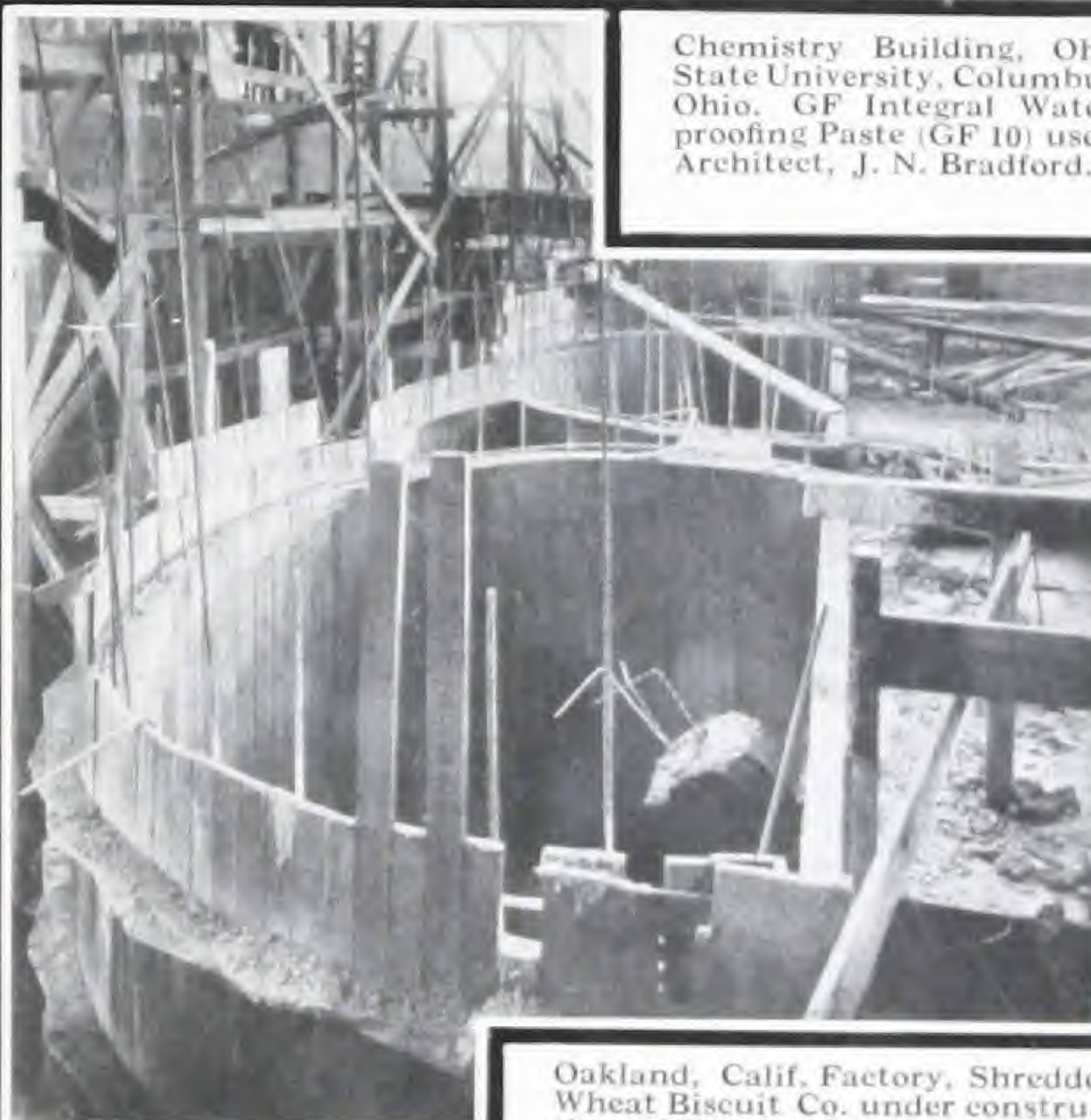
Swimming Pool, J. F. Carlston, Oakland, Calif. Waterproofed with GF 10. Architect, G. E. McCrear, Oakland, Calif. Contractor, A. Lazzaricchi.



Construction scene showing a method of treating gauging water with GF Integral Waterproofing Paste (GF 10). Each barrel of water is treated successively. A continuous supply of treated gauging water is thus maintained.



Chemistry Building, Ohio State University, Columbus, Ohio. GF Integral Waterproofing Paste (GF 10) used. Architect, J. N. Bradford.



Oakland, Calif. Factory, Shredded Wheat Biscuit Co. under construction. GF 10 used throughout for waterproofing.

excess left after the setting process is complete and smaller voids remain after evaporation.

Tests made by the Pittsburgh Testing Laboratory on the flowability of concrete made with untreated water and with water treated with GF 10 in the proper proportions, show that a decrease of 6% of the total water needed can be secured by the addition of the waterproofing paste with no decrease in flowability.

Thus, by the use of GF 10, less gauging water is necessary, a more dense and stronger concrete is obtained, and the capillary tubes of the concrete, which cannot be eliminated, are effectively coated with a water repellent material formed by the chemical reaction of the waterproofing paste with the lime of the cement.

GF 10 is mixed with the gauging water in the proportion of 1 gallon of GF 10 to 34 gallons of water, based upon the use of this quantity of water per cubic yard of concrete.

The specific gravity of GF 10 is the same as that of water so that once dissolved it remains permanently in solution, thereby insuring an equal distribution of waterproofing throughout the concrete.

Test of Concrete Waterproofed with GF Integral Waterproofing Paste (GF 10)

The following letter gives the results of a test performed by Robert W. Hunt & Company, Testing Engineers, on a concrete cube waterproofed with GF 10:

ROBERT W. HUNT & COMPANY
Chicago, Ill.

General Fireproofing Company,
Youngstown, Ohio.

March 8, 1921

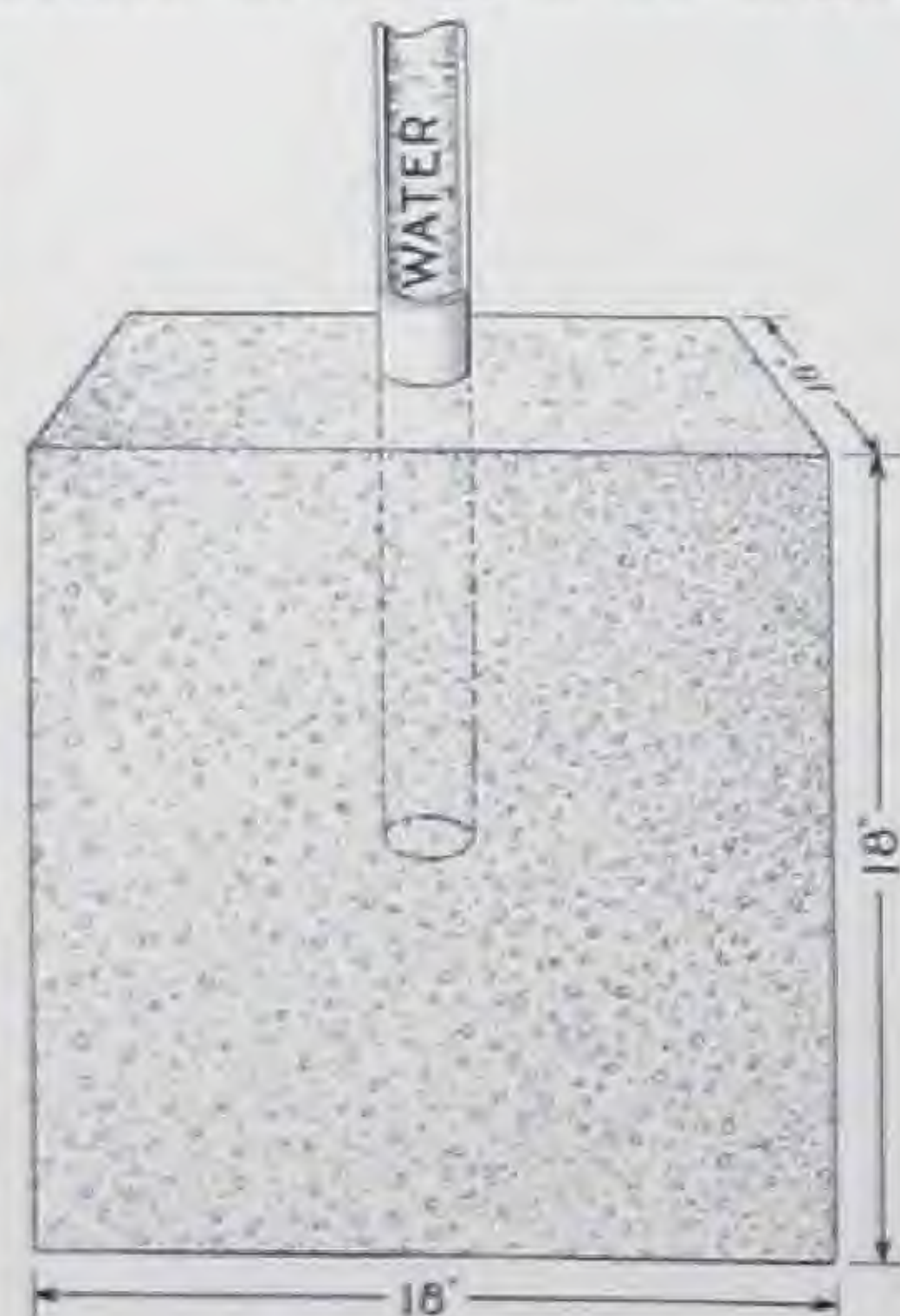
Gentlemen:—

Below we hand you, under Laboratory Nos. 11166 and 11167, results of permeability test on concrete to which GF No. 10 Integral Waterproofing Paste had been added in accordance with your letter of December 31, 1920. The Waterproofing Paste was furnished by you, under your Purchase Order No. 29747.

The specimen tested, consisted of an eighteen-inch concrete cube, having a two-inch diameter pipe imbedded in the center of one face to a depth of twelve inches, leaving a thickness of six inches of concrete between the face of the pipe and the opposite face. The mix for the concrete was one part cement, two parts Torpedo sand and four parts crushed stone, proportioned by volume. As it was specified, that the minimum amount of water was to be used with which the concrete could properly be mixed and placed, it was accordingly mixed to a stiff pasty consistency. This required a mixing water (to which the Waterproofing Paste had been added), equivalent to 55.10% of the weight of the cement in the mix.

The Waterproofing Paste was added to the mixing water in the proportion of one part paste to thirty-four parts water. As the specific gravity of this paste is practically the same as that of water, it is possible to base the proportion either on the weight or volume.

After the test specimen had aged for twenty-eight days, the imbedded two-inch pipe was filled to the top with water and the specimen weighed. The specimen was then subjected to a thirty-pound pressure (which is equivalent to a head of 69.2 feet of water) continuously applied for a period of five days, after which it was disconnected and again weighed with the pipe filled with water. The specimen showed no damp spots on the surface, nor any appreciable increase in weight.



It was thereupon subjected to a sixty-pound pressure (which is equivalent to a head of 138.4 feet of water) continuously for five more days. At the end of this period, the specimen was again weighed and found to have had no appreciable increase in weight, nor were there any damp spots on the outer surface. The specimen was then broken open in a place parallel to the length of the imbedded pipe to determine the depth of penetration of the water. An examination showed that the water had penetrated the concrete only for a depth of $\frac{3}{4}$ " from the end of the imbedded pipe, as shown in the accompanying sketch. The test specimen weighed 511 pounds before commencing the test and did not show any increase in weight amounting to as much as one-quarter pound, which was the smallest increment which could be weighed on our scales.

Respectfully submitted,
ROBERT W. HUNT & COMPANY

Dictated by A. C. Scherer.

Method of Using GF Waterproofing Paste (GF 10)

GF 10 is incorporated into the mixture by dissolving it in the gauging water. For mass concrete the proportion is 1 gallon (8 lbs.) of GF 10 to 34 gallons of water, and for cement work 1 gallon (8 lbs.) of GF 10 to 17 gallons of water.

The simplest ways to secure these proportions are as follows:

(A)—For Mass Concrete.

Into a 50-gallon barrel put $1\frac{1}{2}$ gallons (12 lbs.) of GF 10, fill up with water, then stir until the whole looks like a mixture of milk and water.

(B)—For Cement Plaster, Floor Topping, Stucco, or Mortar for Brickwork.

Put 3 gallons (24 lbs.) of GF 10 into the barrel then fill up with water and stir as above.

Use only the solution of GF 10 and water for wetting up and tempering the dry mixture to the usual consistency.

(C)—Where a Mixer with Water Attachment is Used.

Fill a barrel or other container with a solution made of 1 gallon (8 lbs.) of GF 10 to each 5 gallons of water, stirred as before directed. Put into the mixer 1 gallon of this solution for each bag of cement used and then let in enough water to bring the batch to the usual consistency. This is for either mass concrete, cement plaster, floor topping, stucco, or mortar for brickwork.

Quantities Required and Shipping Data

It requires,

- 1 Gallon (8 lbs.) of G. F. 10 to waterproof 1 cubic yard of concrete,
- Or 100 sq. ft. of $\frac{3}{4}$ " cement plaster or 1" floor topping
- Or mortar for 1,000 brick bedded and grouted
- Or 20 sq. yds. of stucco.

Shipped in

- 8 lb. cans.
- 40 lb. cans.
- 240 lb. half-barrels.
- 400 lb. barrels.

Shipping weight about $9\frac{1}{2}$ lbs. per gallon.

SPECIFICATIONS

For the Waterproofing of Concrete Against Inside and Outside Pressure by the use of GF Integral Waterproofing Paste (GF 10).

GENERAL

1—Waterproofing

GF Integral Waterproofing Paste (GF 10), as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from them or their authorized agents. The paste must be brought to the building site in original and sealed packages. This paste must be used without adulteration and in accordance with the manufacturer's specifications and directions.

2—Cement

All cement shall be a high grade Portland Cement meeting satisfactorily the requirements of the Standard Specifications of the American Society for Testing Materials. It shall preferably be so ground that eighty per cent (80%) shall pass a standard two hundred (200) mesh sieve.

3—Sand

All sand shall be free from oils, loam, clay, vegetable or other deleterious organic matter and uniformly graded from coarse to fine in size.

4—Draining

Before actual waterproofing is begun, all water shall be drained away from surface to be waterproofed. Provision must be made to keep this water away during the process and until the last section of waterproofing is thoroughly set.

5—Materials

All concrete used in the (name part of work) is to be mixed in the proportions of one part cement, two parts sand and four parts aggregate. (Or one part cement, two and a half parts sand and five parts aggregate.)

6—Mixing

A dry mixture of cement, sand and stone is to be made, preferably in the proportion 1-2-4 which shall be tempered to a quaking consistency.

GF Integral Waterproofing Paste (GF 10) shall be added to the water, so that the proportion shall be 1 gallon of GF 10 to 34 gallons of water.

7—Placing

All concrete is to be placed in one continuous operation where possible. Each pouring is to be thoroughly spaded to insure uniform density in the wall or floor.

8—Necessary Joints of New to Old Work

Where joints are absolutely unavoidable the old surface must be roughened with mason's chipping hammer; then thoroughly wire brushed.

The resulting surface shall have holes at least $\frac{1}{4}$ " deep and not more than 2" on centers in every direction.

After this has been done the face of the joint is to be treated with a solution made of 2 pounds of GF Bonding Compound (GF 400) dissolved in a gallon of water. This solution is to be applied with a corn broom or acid brush. After all chemical action has ceased the surface is to be thoroughly washed with clean water, using a hose if possible.

While the surface of the concrete is still wet, a thin cream of cement and water (the water to have in it GF Integral Waterproofing Paste) is to be applied and the new concrete poured immediately.

9—Curing

The work is to be allowed to cure the ordinary length of time before the forms are removed.

JOINTS OF BRICK, STONE OR TILE WORK—GF INTEGRAL WATERPROOFING PASTE (GF 10) INCORPORATED THROUGH THE MORTAR

General—Sections 1 to 6 to be carefully followed, and

10—Material

The mortar for the joints is to be mixed of one part cement to two parts sand or one part cement to two and a half parts sand. In either case GF 10 is to be added to the water used in mixing this mortar, in proportion of 1 gallon GF 10 to every 17 gals. of water.

11—Mixing

The cement and sand are to be thoroughly mixed together, turning over the mass at least three times. Then the water, in which has already been dissolved the GF 10, is to be added and the mixture thoroughly turned over until it is of even consistency.

12—Brick Wall

All brick shall be thoroughly wet just previous to being laid, except in freezing weather, when they shall be thoroughly dry. The brick shall be laid with full beds and joints properly and solidly bonded. No mason work of any description shall be built when the temperature is below 28 degrees F. on a rising temperature or 32 degrees F. on a falling temperature, at the point where the work is in progress. No frozen materials shall be built upon in any case.

13—Stone Wall

All stone shall be laid on their natural bed. No stone which does not bond or extend into the wall at least 6" shall be used. Stones shall be firmly bedded in mortar of the same mixture as specified for brick walls, and all spaces and joints shall be thoroughly filled with like mortar.

14—Application

The brick or stone are to be laid in the usual manner except that great care must be taken to see that all beds and joints are full and continuous.

The faces of all joints must be struck off true with a trowel so as to leave no holes or seams.

Great care must be taken to fill entirely around all pipes, etc., breaking through the wall. In addition, all these pipes must be painted with GF 200 to form a flexible joint.

15—Flat Tile Roof

The bed of mortar in which the tile are laid is to be at least 1" thick, made after the proportion hereinbefore specified.

16—Laying Tile

The tile are to be embedded in this mortar and trued up, leaving at least a $\frac{3}{8}$ " joint between all tile.

17—Pointing

The pointing mortar is to be made of the same proportion as that for the bed. The joints must be thoroughly filled and mortar well trowelled down so as to leave no holes or voids.

18—Grouting

The grout is to be made of the same proportion as above specified, except that additional water, containing GF 10 in the proper proportion, is to be used to render the mixture sufficiently liquid to pour into these joints.

All joints shall be filled flush with the surface and the grout be so poured that no air is imprisoned in the joints.

19—Pitched Roof

The mortar used in pointing the joints of tile (joints to be not less than $\frac{3}{8}$ " wide) is to be of the same proportions as hereinbefore specified, applied in accordance with directions in Paragraph 17.

Waterproofing Concrete and Masonry by the Application of a Waterproofed Cement Plaster Coat

WHERE waterproofing has been omitted from the concrete or where the necessity for it develops later, a perfect job of waterproofing can be done by applying to the interior surfaces of walls and floors a waterproofed cement plaster coat. This method may also be followed in the case of brick and stone walls.

For this class of work the cement plaster coat is waterproofed by the integral method, using one gallon of GF Waterproofing Paste (GF 10) to 17 gallons of water. The cement plaster coat should consist of a mixture not leaner than one part of cement to two parts of sand.

SPECIFICATIONS

For Waterproofing Basements, Pits, Tanks and Pools by the Application of a Waterproofed Cement Plaster Coat

General—Paragraphs 1 to 6 inclusive are to be carefully followed, and

20—Preparing Concrete Surfaces to Receive Waterproofing

The surfaces of concrete walls are to be thoroughly roughened with a mason's chipping hammer, then wire brushed and treated with GF Bonding Compound (GF 400) before any waterproofing is applied.

Two pounds of GF Bonding Compound (GF 400) are to be dissolved in a gallon of water. This solution is to be well rubbed into the surface with a corn broom or acid brush. After all chemical action has ceased, the wall is to be thoroughly slushed with a hose if possible, to remove all salts and loose particles resulting from the action of GF Bonding Compound (GF 400).

21—Preparing Brick or Stone Walls

The joints shall be raked out at least $\frac{3}{8}$ " and then wire brushed to remove loose particles of mortar. Wire brush entire surfaces of walls and apply GF Bonding Compound (GF 400) as specified in Paragraph 20.

22—Preparing Floors

When topping and underbed are laid at the same time, the topping must be applied before the underbed has obtained an initial set. When underbed of concrete is set or the waterproofed coat is to be applied over an old floor, the surface must be thoroughly chipped so there shall be holes at least $\frac{1}{4}$ " deep and not more than 2" on centers in any direction. All loose or hollow spots to be cut out and replaced with new concrete. GF Bonding Compound (GF 400) shall be used as specified in Paragraph 20 to ensure a perfect monolithic bond between the new and the old work. It is of course essential that the concrete floor to which the new waterproofed cement coat is applied is sufficiently strong to withstand the hydrostatic pressure from below (see tables, page 6). If not, it will be necessary to lay more reinforced concrete on top, to which the new waterproofed cement coat shall be applied.

23—Grout

All masonry surfaces are to be saturated with as much water as they will absorb before applying the cement grout.

A thin cement grout or wash is to be applied to all surfaces to be waterproofed, immediately before the waterproofed cement plaster coat is put on and directly after the saturation is completed. The cement grout is to be of neat cement and water of such consistency that it may be applied to the surface with a brush.

24—Materials

The mortar for the waterproofed cement plaster coat is to be mixed of not less than one part cement to two parts sand nor more than one part cement to two and one-half parts sand.

GF Integral Waterproofing Paste (GF 10) is to be added to the gauging water in the proportions of 1 gallon GF 10 to 17 gallons of water.

25—Mixing Quantities

The cement and sand are to be thoroughly mixed together, turning over the mass at least three times. Then the water used for tempering this mass, in which has already been dissolved the GF 10, is to be added and the mixture thoroughly turned over until it is of even consistency.

The same mixture and proportions are to be used for both coats.

26—Application

Scratch Coat—Immediately after the cement grout has been put on, the first scratch coat of waterproofed cement plaster shall be applied, and brought to a fairly smooth and level surface.

Scratch coat shall be about $\frac{3}{8}$ " thick and after it has obtained sufficient set it is to be thoroughly scratched to afford a key for the second coat. Care should be taken that the scratching does not penetrate the entire depth of the scratch coat.

Finish Coat—Not more than 24 hours later the second (finish) coat of waterproofed cement plaster shall be applied. This coat shall be floated free from all imperfections, using in this process the greatest pressure it is possible for the workmen to apply. Then the surface is to be finished to a smooth, even texture with a steel trowel.

The total thickness of the two coats should not exceed $\frac{3}{4}$ ".

(Note—In case it is not necessary to apply a waterproof cement plaster coat over the entire surface of the floor, a narrow gutter $2\frac{1}{2}$ " deep by $3\frac{1}{2}$ " wide should be cut down into the floor, close up to the wall, treated in the same manner as the side walls as specified in Paragraphs 20 and 23 and filled with cement plaster which is to be troweled out and up to an even surface with the surrounding flooring. This to be put in simultaneously with the finish coat on the walls.)

27—Caution

All pipes or other conduits extending through the walls to be waterproofed, shall be painted thoroughly with a coat of GF Brush Coating (GF 16) before the waterproofed cement plaster coat is applied.

28—Top Finish over Floor

After all traces of grease, dirt and other foreign matter have been carefully removed, the surface of the floor shall be treated in accordance with Paragraphs 20 and 23.

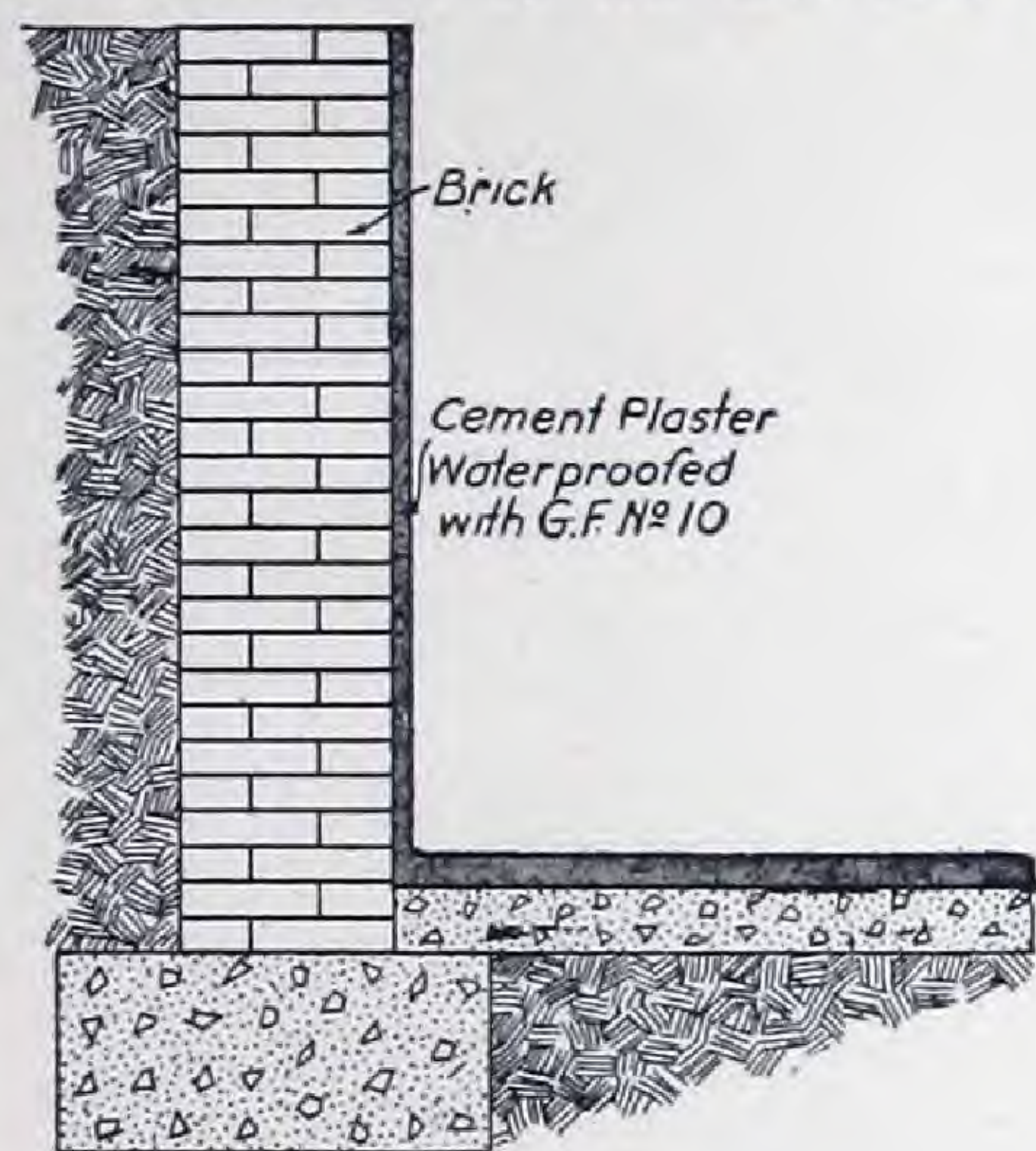
The cement plaster coat for 6 inches up the walls from the angle of the walls and floor shall be roughened and treated with GF Bonding Compound (GF 400) for the reception of the

floor waterproofing so as to obtain a perfect bond and tight joint at this point.

The waterproofing over the floors shall be carried up this wall waterproofing in the form of a coved base for a distance of about 6"

All encumbrances upon the floor that cannot be removed or any pipes extending through the work to be waterproofed shall be painted with GF Brush Coating (GF 16) to form a flexible joint with the waterproof coat over the floor.

The waterproof mortar is to be applied in one coat to a thickness of (this thickness must be such that the weight of the concrete or the strength of it, if reinforced, will overcome the estimated hydrostatic head under the entire surface of the floor), and up the side wall in the form of a base 6" above the general level of the floor.



After this mortar has obtained sufficient set, it is to be floated free from all imperfections and troweled smooth with a steel trowel. In the course of this floating and in the troweling, as much pressure as possible must be exerted to finish the surface free from imperfections.

29—Joints

This floor to be laid without joints.

Watertight joints in walls or floors between each day's work to be obtained by working up to a wood strip of the desired thickness; next day remove this strip, break back the edge for a distance of about 1", treat the new edge with GF 400 and cement grout as before described in Paragraphs 20 and 23, and lay the new finish well up to this edge taking special care in floating and troweling such joints to prevent later opening or cracking.

The waterproofed cement coat to be continuous over all floor surfaces, walls, pits, trenches, etc. under and behind all abutting walls and partitions, and columns. If it cannot be carried under and behind walls, partitions or columns, then it must be carried up on all sides of same from floor to grade level.

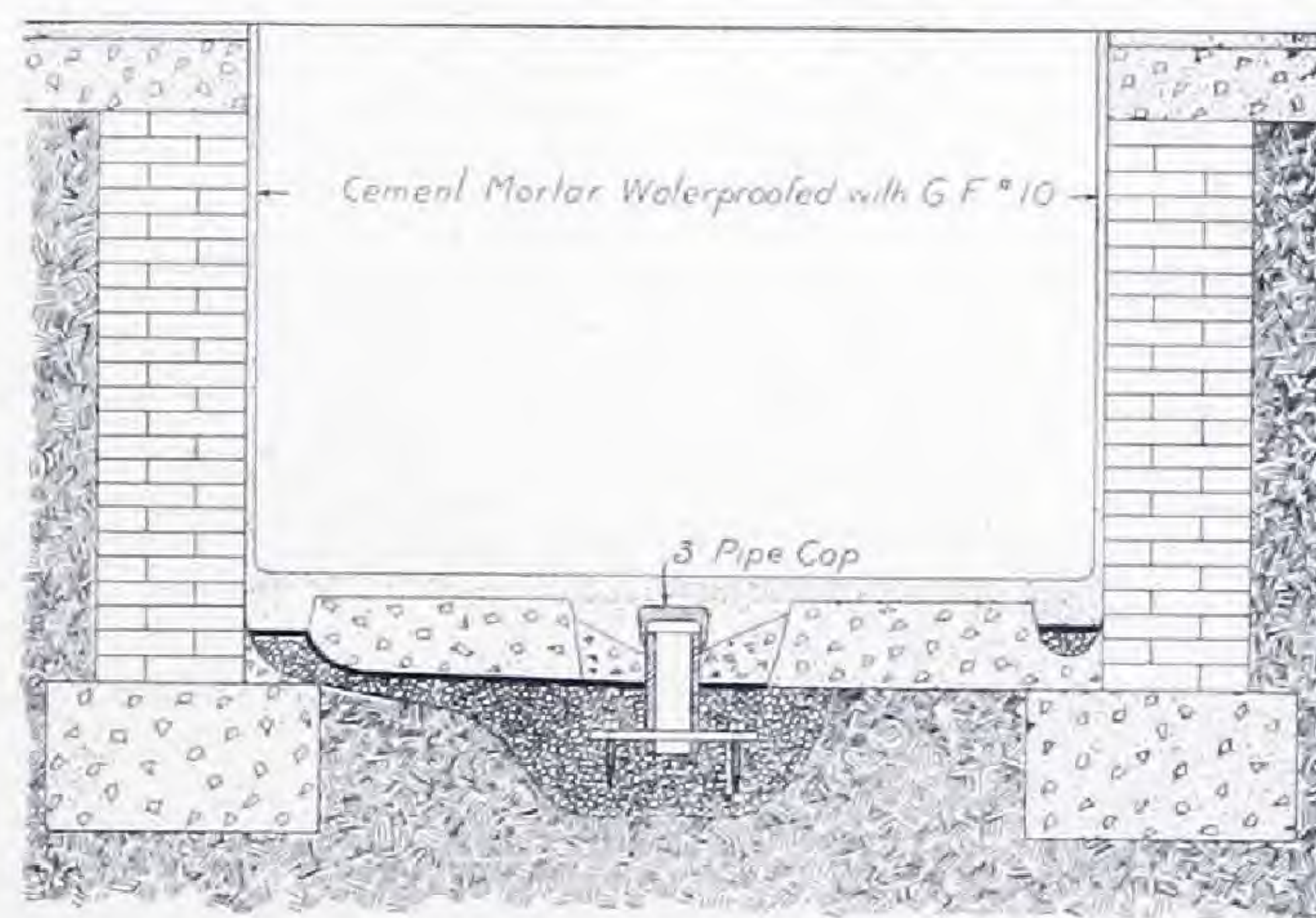
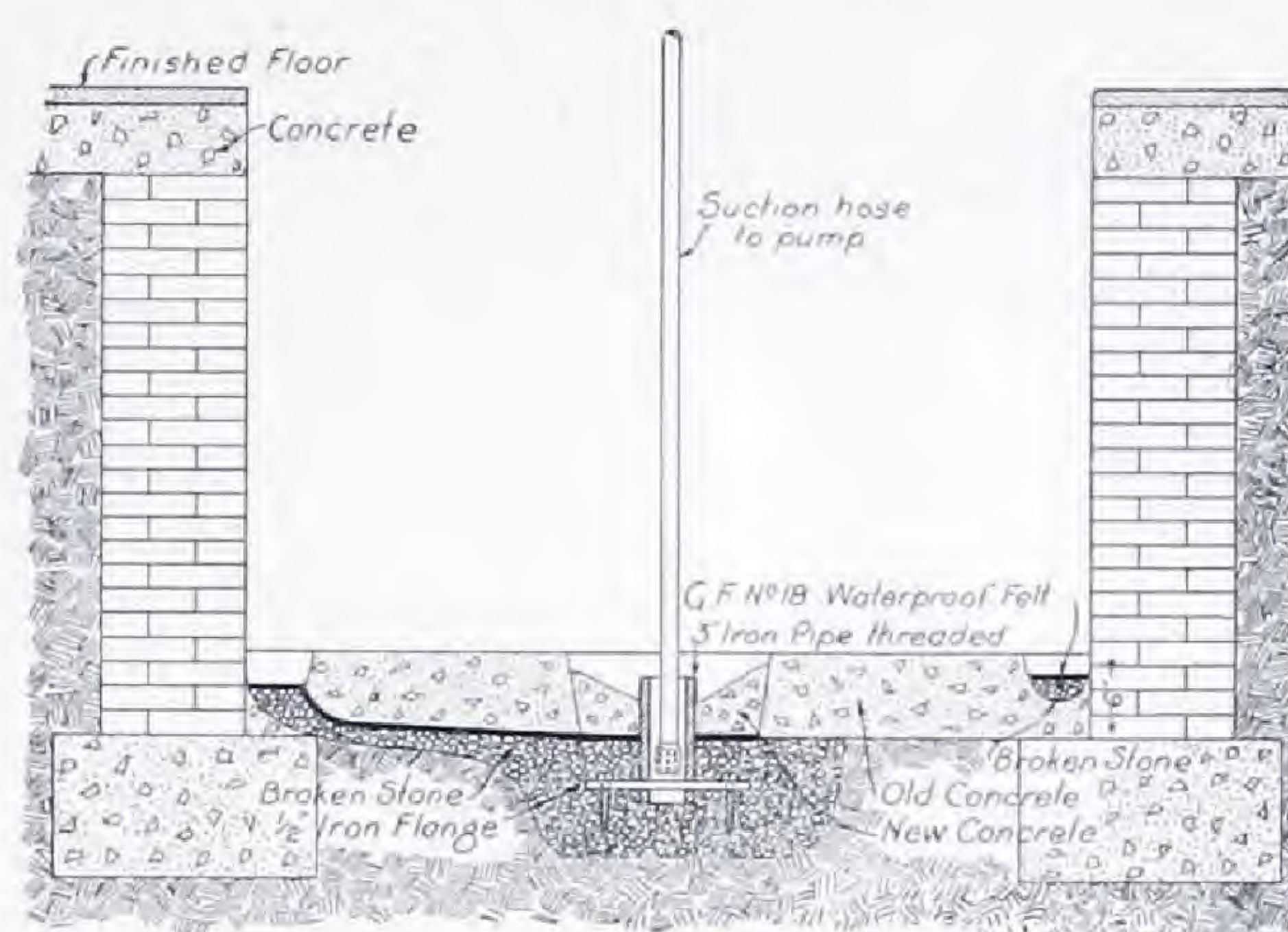
30—Pumping

In cases of continual water pressure the work is to be kept clear of water by pumping continuously during the progress of the work and until the waterproofed cement coating has set dry, white and hard.

This is best done by locating the pumphole outside the walls. In cases where this is not possible it should be located in the middle of the floor and made 12" deep, below the underside of the concrete floor. Occasionally this may not suffice to keep the water from coming up through the floor or through the walls. In such case, cut a drain in the floor all around the walls about 6" deep and 3" wide, conducting it across the floor to the pumphole. This drain to be filled with broken stone or gravel and covered with a layer of dry tar

paper to prevent choking up by the installation of the waterproofed cement coating. If water comes through the walls, cut slots in the wall about 1" deep and 1" wide leading down into this drain. When applying the cement plaster coating over these slots and drains, incorporate into the finish a piece of expanded metal lath about 4" wide to reinforce the cement coating against cracking.

Into the pumphole insert an unpainted cast iron pipe of sufficient diameter to take the suction pipe of the pump. This cast iron pipe to have an iron flange at the lower end drilled to take four 4" iron bolts to hold the pipe in place and prevent twisting. The top of the pipe to be threaded to take an iron cap which is to be screwed on when the waterproofing is completed. This pipe to be set in the pumphole so that the top of the cap will be 2" below the finished floor level. The bottom of the pumphole to be filled with broken stone to support the flange, and the pipe tightly packed with broken



stone, the floor waterproofing to be finished up to a wood frame around the pipe.

After floor is thoroughly set, remove wood frame, treat edges of floor waterproofing with GF 400 and cement grout as before specified. (Par. 20 and 23) Pump water as low as possible, remove pump, screw cap over pipe and fill over with waterproofed cement mortar the same as the rest of the floor, taking special care in well floating and troweling the joint. A piece of board to be laid over this and well weighted to keep it in position until the new mortar has thoroughly set.

In cases where the water pressure is not very great or the water rises slowly, the iron pipe can be omitted and pumping done from a hole left just large enough to take the suction pipe. Finish the floor waterproofing up to a wooden frame as before specified; when ready to close the pumphole, remove this frame, treat edges of floor waterproofing with GF 400 and cement grout; pump water as low as possible, remove pump and fill hole to within 2" of the top with a mixture of soda ash and cement 1 to 1 slightly dampened with water and GF 10. Tamp tightly into hole and cover immediately with waterproofed cement finish floated and troweled and weighted down as before specified.

WATERPROOFED CEMENT PLASTER COAT APPLIED ON OUTER FACE OF AND UNDER WALLS AND OVER OR UNDER TOP OF FLOORS

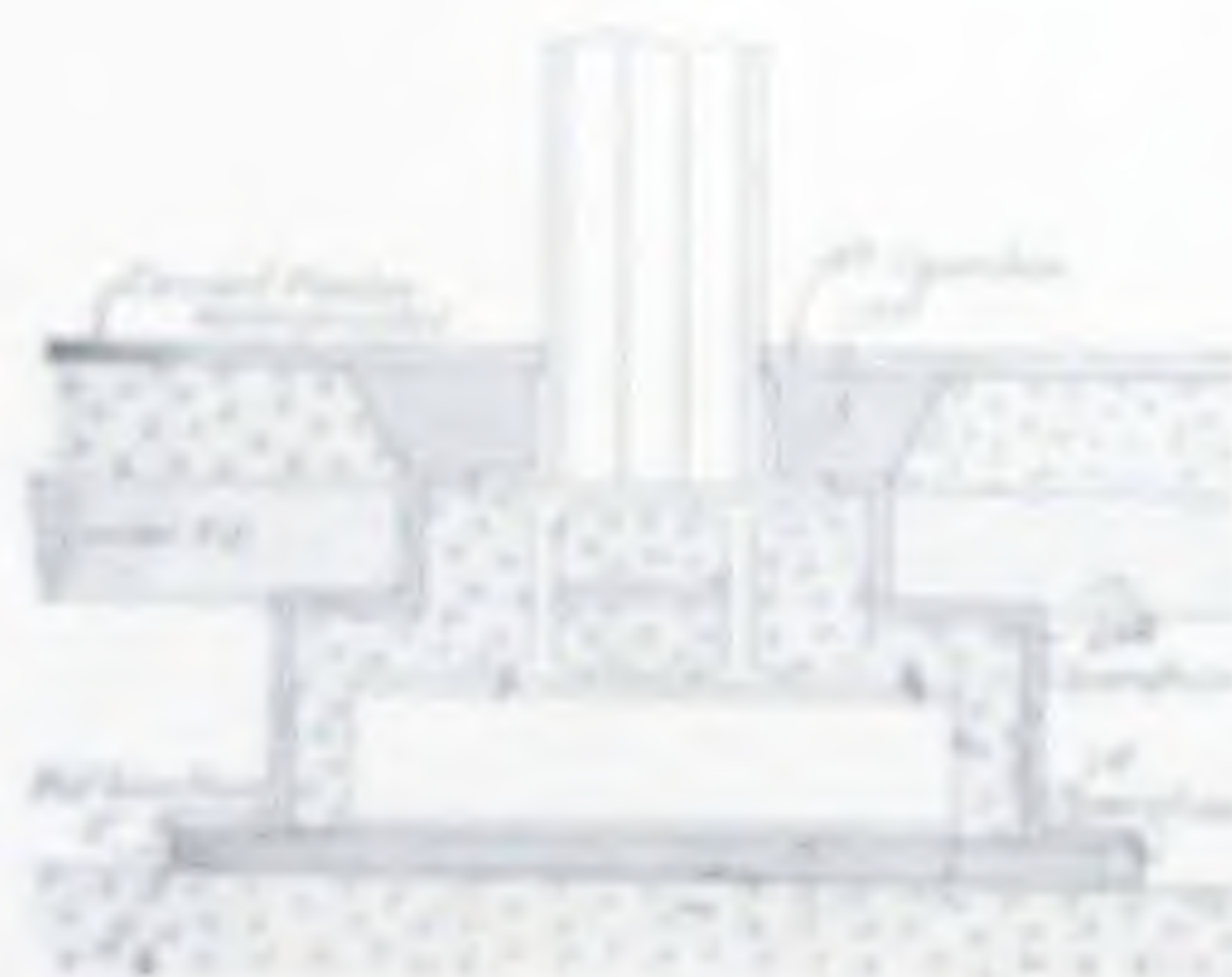
General—Paragraphs 1 to 6 inclusive and
20 and 23 are to be carefully followed, and

31—Treatment of Footings

After the footings have been set in place and while they are still green, a 1" coat of waterproofed cement mortar shall be plastered over the top of them. This waterproof coat shall be carried either side of the wall line the full width of the footings and well scratched beyond the wall line.



Waterproofing Footing for Concrete Columns
with GF 10



Waterproofing Wall Column Footing and Collage

22—Treatment of Walls

After the side walls have been set in place, roughened, treated with GF 400 and saturated, and while the surface is wet, apply neat cement grout with a brush and immediately plaster the first coat of waterproofed cement plaster over the wall from the top of the footing up to 1" to 2" above grade. The first coat should be about 3/4" thick and should be thoroughly scratched to afford a key for the second coat. The second coat is to be applied not more than 24 hours later and is to be well floated and troweled to a dense smooth finish.

23—Back Fill

After the second coat of waterproofed cement mortar has been applied and thoroughly troweled up, the back fill may be done directly against the plaster coat.

24—Joint at Footings

The tops on either side of the walls shall be treated with GF 400 and cement grout as before specified (Par. 20 and 23) to afford perfect bond for floor and outside wall waterproofing.

35—Joint at Floor

Before the concrete floor is laid a waterproofed cement plaster coat applied as specified for the outside of the walls, shall be carried from the top of the footing to a point 6" above the surface of the finished floor inside.

Cover floors with waterproofed cement firmly bonded to floor with GF 400 and cement grout as before described and well floated and finished, carried up on walls to form a 6" coved sanitary base. The floor and base, to be laid without joints, making joints between day's work as described in Paragraph 29.



WATERPROOFING SWIMMING POOLS, TANKS, ETC., BY THE PLASTER COAT METHOD

General—Paragraphs 1 to 6 inclusive and
20 and 23 are to be carefully followed, and

36—Connecting Drains

All inlet pipes, outlet pipes, or floor drains are to have copper flashings, extending at least 6" from the side of and soldered firmly to the pipe or drain, this flashing to extend at right angles from the pipe or drain into the concrete.

This flashing shall be painted with two thorough coats of GF Damp-proofing Coating (GF 200), or GF Foundation Damp Coating (GF 10), in order to give a flexible joint between the concrete and flashing.

37—Tile or Brick Lining

Before the tile or brick lining is put in, the surface of the concrete is to be thoroughly cleaned in order to afford a bond for the mortar used in setting.

The mortar used in setting the tile or brick is to be waterproofed with GF Integral Waterproofing Paste in the proportion of 1 gallon of GF 10 to 17 gallons of water.

38—Cement Plaster Coat, Waterproofed

A cement plaster coat at least 3/4" thick is to be applied to the side walls and floor of this pool. The mortar used for this cement plaster coat is to be composed of one part cement, two parts clean, sharp sand. This mixture is to be tempered to proper working consistency with water to which has been added GF 10 in the proportion of 1 gallon of GF 10 to 17 gallons of water.

The final coat of mortar is to be scratched, as soon as it is set up sufficiently, in order to afford a mechanical bond for the mortar used in setting the enamel brick or tile lining.

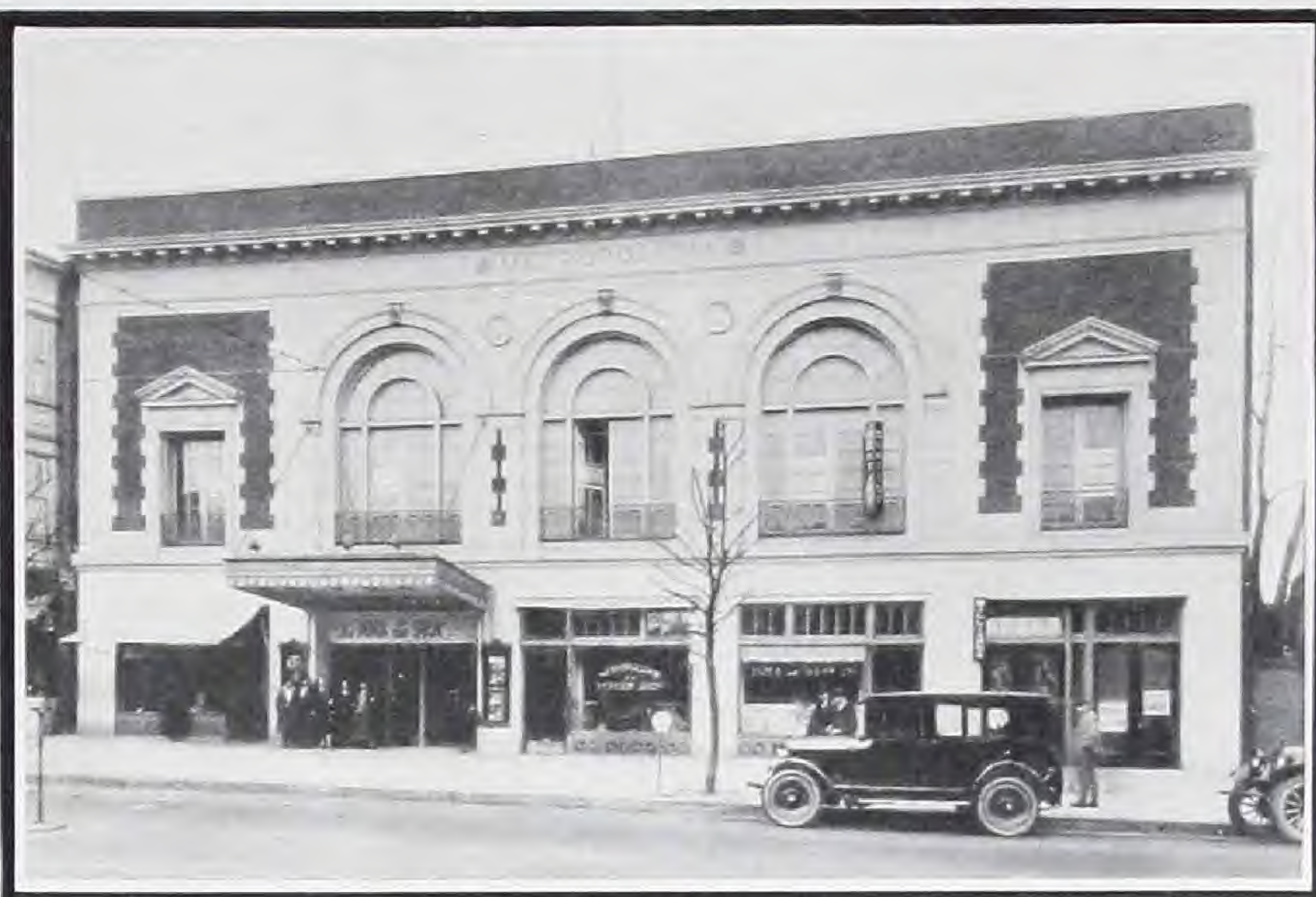
Finish—In case no brick or tile lining is to be used, the surface of the finish coat is to be troweled smooth with a steel trowel.

39—Platform Around Pool

The cement plaster coat is to be carried through the gutter up and over the platform surrounding the pool, and up the walls surrounding the platform to form a 6" base.



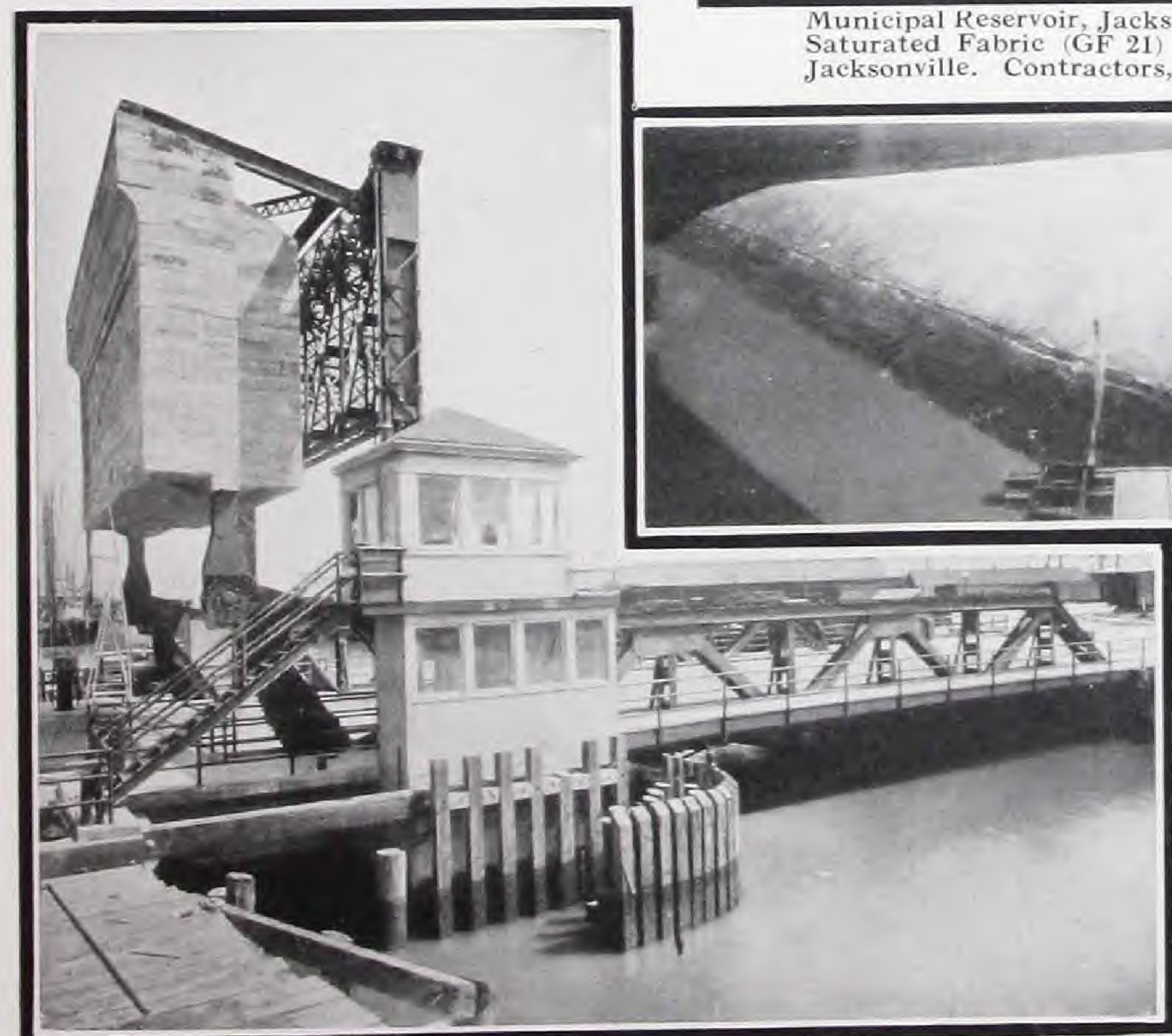
George Washington Hotel, Washington, Pa. GF Integral Waterproofing Paste (GF 10) used. Architect, James W. Stoddard, New York City. Contractors, John W. Cowper Pittsburgh.



Metropolitan Theatre, Baltimore, Md. GF Dampproof Coating (GF 200) used. Architect, Otto Simonson. Contractors, Consolidated Engineering Company



Municipal Reservoir, Jacksonville, Fla. GF Bitumen Mop Coating (GF 17) and Saturated Fabric (GF 21) used for waterproofing. Architect City Engineer, Jacksonville. Contractors, Southern Construction Co.



Strauss-Bascule Bridge, San Francisco. GF 10 used for waterproofing. Engineer, M. M. O'Shaughnessey, San Francisco. Contractors, The Thomson Bridge Co.



One million gallon reservoir, Holland, Michigan. One-half above and one-half below grade. Waterproofed with GF 10. Engineer, R. E. Champion, Holland.

BREAK OR OPENING IN SURFACES WHERE CONCRETE IS WATERPROOFED BY THE INTEGRAL OR PLASTER COAT METHOD

(Note—Sometimes a break occurs in a wall or floor that has been waterproofed by the Integral Method, either in the mass or by a plaster coat, because of the settlement of the building, defective workmanship, the removal or placing of pipes, or external damage.)

40—Large Break or Opening

In case the break admits either a single large stream or several small streams of water, remove the entire area of the affected surface to a depth of $\frac{3}{4}$ " leaving the surface rough.

General—Paragraphs 1 to 6 inclusive and 20 and 23 are to be carefully followed, and

41—Bleeding

Provide several pieces of $\frac{1}{4}$ " iron pipe (two or three inches in length) and drive one piece into the surface wherever water enters, leaving the end projecting about $\frac{1}{4}$ " beyond the roughened surface. After the pipes are all placed, the water will generally enter only through the pipes.

42—Application

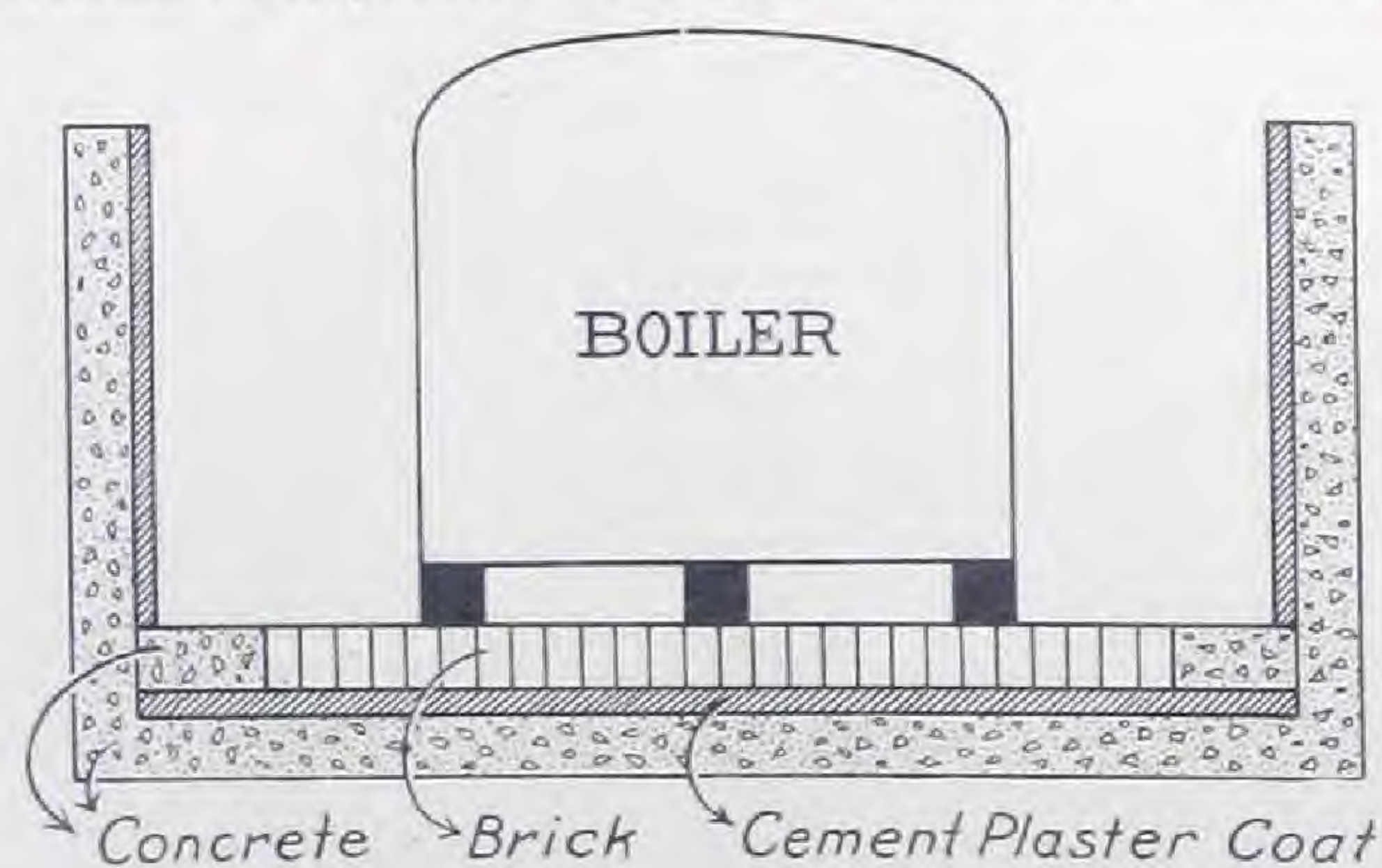
After the wall is thoroughly saturated and cleaned with GF 400, apply over the whole of the affected area two coats of Portland Cement Mortar, as specified waterproofed with GF 10, finishing the surface flush with the old adjoining surface.

After this coating has thoroughly set and dried, plug up the ends of the bleeders (pipe) with a piece of wood driven in tight. Then cover with cement mortar, connecting this mortar to the adjoining cement coating, using GF 400 and Cement Grout as specified in Paragraphs 20 and 23.

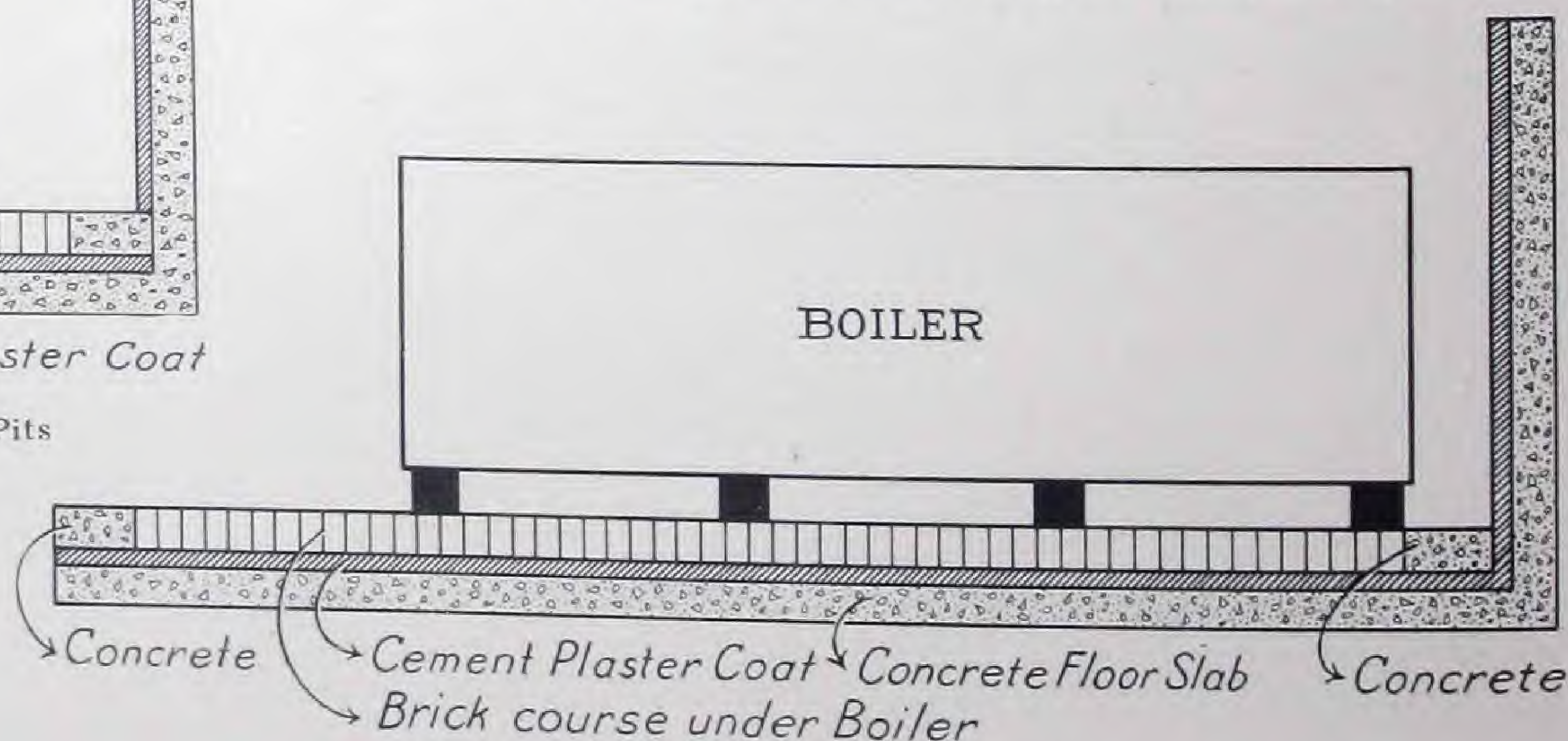
Only a few of the "bleeders" are to be plugged daily, working from the outside to the center of the space, allowing sufficient time for the newly applied cement plaster coating to set hard before closing any more "bleeders." The last "bleeder" is plugged and waterproofed in the same manner as the others and immediately covered with wet straw boards firmly braced and kept wet until the cement plaster coating has set.

43—Small Break or Opening

If the break is small, clean the surface of all loose particles of cement, dirt, etc., and treat with a liberal application of GF 400. Apply over the surface two coats of Portland Cement Mortar waterproofed with GF 10. Both coats must be worked



Method of Waterproofing Boiler Pits



well into the edges of the old plaster coating. After this is done, cover immediately with wet straw boards firmly braced to position, and kept so until the plaster coat has set.

44—Crack

If the leak or opening takes the form of a long crack, and there is considerable water coming through it, the best method to pursue is to cut an inverted key into the wall, treat the sides of this key with GF 400, and then fill key full of mortar waterproofed with GF 10 as specified for other plaster coat work.

After this mortar has been tamped in as firmly as possible, it is to be braced with wet straw boards covered with planks. These are to remain in position and kept wet for several days until the mortar has had a chance to set thoroughly.



Swimming Pool, Woman's Athletic Club, San Francisco, GF 10 used. Bliss and Faville, Architects

PLASTER COAT METHOD OF WATERPROOFING BOILER PITS

General—Paragraphs 1 to 6 inclusive and 20 and 23 are to be carefully followed, and

45—In Case of Excessive Water Pressure

Walls and floors should be relieved of pressure as indicated in Paragraph 30. The same method of waterproofing for boiler pit shall be followed as in case of an ordinary pit or basement, except that directly underneath the boiler a course of fire brick shall be laid, same to extend at least 2' on each side of the boiler and 4' in front of the boiler, as shown by detailed illustration herewith. This will prevent hot coals from burning out and destroying the waterproofing course.

Waterproofing Concrete by Means of an Integral Waterproofing Powder

SOME architects in specifying integral waterproofing, require a powder to be mixed with the cement in place of a paste dissolved in the gauging water. For such work the powder must be a waterproof material in itself, and its success is largely dependent upon very careful and thorough mixing with the cement.

GF Integral Waterproofing Powder (GF 11)

GF Integral Waterproofing Powder (GF 11) is the same material which forms when GF Paste (GF 10) combines with cement, in the finished concrete or mortar. It is therefore classed as a pre-formed waterproofing element.

In the finished mass, whether concrete or mortar, (GF 11), maintains its water repellent qualities permanently. In no way does it affect the set of material with which it is used.

Shipped in 50-lb. bags.

General Directions and Quantities Required

GF Integral Waterproofing Powder (GF 11) is to be added to Portland Cement in the proportion of two pounds to each bag of cement or eight pounds to each barrel used in any mixture. These two are to be thoroughly mixed dry so as to insure complete distribution of the GF 11.

Add this mixture to the sand, which should never be less than two parts nor more than two and a half parts by volume, the whole to be manipulated until the mass is evenly mixed and is uniform in color. In case of mass concrete this mixture is to be added to the aggregate and thoroughly turned over at least three times.

SPECIFICATIONS FOR WATERPROOFING BY MEANS OF GF INTEGRAL WATERPROOFING POWDER (GF 11)

The specifications for the use of GF 11 are in all cases exactly the same as before described for GF 10 for either mass concrete or by the plaster coat method, except that GF 11 Waterproofing Powder is used instead of GF 10 Waterproofing Paste

COVERING CAPACITY—MASS CONCRETE

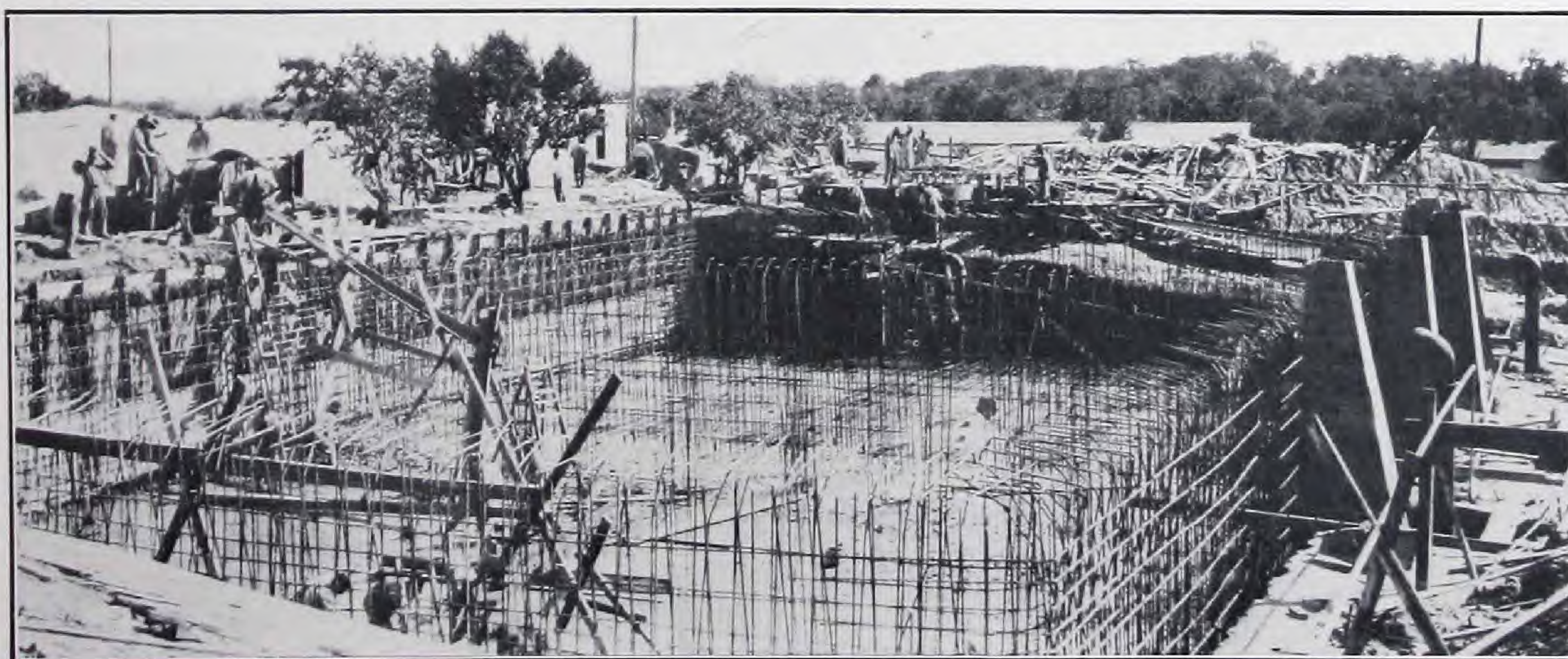
Material Required for Cubic Yard

Mixture	Cement	Sand	Stone	GF 11
1:2:4	1.51 bbls.	.45 cu. yds.	.89 cu. yds.	12.08 lbs.
1:2½:5	1.24 "	.46 "	.92 "	9.92 "

WATERPROOFED CEMENT MORTAR

Material Required for 100 Square Feet Waterproofed Cement Plaster

Mixture	Thickness	Packed Cement	Loose Sand	GF 11
1:2	2"	2.06 bbls.	.58 cu. yds.	16.48 lbs.
	1½"	1.54 "	.44 "	12.32 "
	1¼"	1.28 "	.36 "	10.24 "
	1"	1.03 "	.29 "	8.24 "
	¾"	.9 "	.25 "	7.2 "
	¾"	.77 "	.22 "	6.16 "
	5/8"	.64 "	.12 "	5.12 "
1:2½	2"	1.76 "	.62 "	14.08 "
	1½"	1.32 "	.46 "	10.56 "
	1¼"	1.10 "	.39 "	8.8 "
	1"	.88 "	.31 "	7.04 "
	¾"	.77 "	.27 "	6.16 "
	¾"	.66 "	.23 "	5.28 "
	5/8"	.55 "	.19 "	4.4 "



Reservoir of the State Hospital, St. Joseph, Mo., Waterproofed with GF 11

Waterproofing by Means of Bituminous Coatings and Membrane Materials

IN a great many cases where substructural work must be waterproofed against considerable hydrostatic head with no permanent drainage system to carry off the water, a heavy waterproof mat is necessary. This mat has no structural strength in itself and must, therefore, be supported by a concrete slab or brick retaining wall of sufficient strength to withstand the hydrostatic head.

For example: If the waterproof mat or membrane is to overcome an eight foot head of water the backing wall and concrete slab must be built to resist a pressure of 500 pounds per square foot. See tables pages 13 and 14.

A membrane used under such condition must be tough, pliable and totally impervious to water or any acids which might be held in solution. Unless it is also elastic so as to expand or contract with the wall, serious breaks may occur from temperature changes.

GF Bitumen Mop Coating (GF 17)

GF Bitumen Mop Coating (GF 17) is a heavy bitumen used as a base for building up membrane waterproof courses. It is free from such elements as residuum oils, resin, etc., which have no permanent waterproofing value because they become brittle and crack off in contact with water or moisture. GF Mop Coating remains elastic at zero and will not run or slide at 110 degrees Fahrenheit. It repels water, ammonia solutions, hydrochloric and sulphuric acids and saturated solutions of sodium chloride.

It must be melted before using and applied hot and is used over GF Foundation Brush Coating (GF 16) which aids in bonding. This is particularly true when waterproofing in cold weather or over concrete surfaces.

The covering capacity of GF Mop Coating (GF 17) is
5 gallons per 100 sq. ft. Mop Coating
9 gallons per 100 sq. ft. 1-Ply Work
13 gallons per 100 sq. ft. 2-Ply Work
17 gallons per 100 sq. ft. 3-Ply Work
Shipped in 50 gallon drums
Shipping weight 8½ pounds per gallon.

GF Waterproofing Felt (GF 18)

GF Waterproofing Felt (GF 18) is manufactured for use with GF Mop Coating (GF 17). It is a strong, water repellent felt made up of wool stock with linen and wool fibre to give it great tensile strength.

GF Waterproofing Felt (GF 18) is thoroughly saturated during the process of manufacture so that every fibre is thoroughly covered and saturated with the bitumen used. This method of saturation as compared with the simple dipping process, leaves the felt pliable and elastic even under low temperature and protects it completely against water, acids and alkalis. Its toughness is also increased by the GF method of saturation, in which the waterproofing element penetrates as well as coats the felt.

Shipped in rolls of 400 sq. ft. each.
Shipping weight 60 lbs. per roll.

GF Saturated Fabric (GF 21)

On work where it is advisable to use Membrane Waterproofing, the development of even a slight leak would cause a great deal of damage, and very often the natural vibration of the structure or its expansion and contraction are so great that a waterproof felt will not withstand the strain.

Under such conditions a fabric must be used that is exceptionally elastic, expanding in any direction without danger of breaking, and with enough tensile strength to resist a considerable head of water, in case there is a split in the backing wall or floor. Bridge decks, above-grade swimming pools and similar structures require this class of waterproofing, and as there are often a great many sharp angles to turn, the fabric must be flexible enough to fit snugly without cracking.

GF Saturated Fabric (GF 21) consists of a heavy, fine quality, cotton fabric so saturated with pure bitumen that every thread and fibre is thoroughly soaked with the waterproofing. This method not only effectively waterproofs the fabric, but also preserves all of its natural tensile strength, elasticity and flexibility.

Shipped in rolls 120 sq. yds. each.
Shipping weight, 102 lbs. per roll.

Physical Properties of GF Bitumen Mop Coating (GF 17)

Weight per gallon.....	8.33 lb
Specific Gravity @ 60 F.....	1.012
Melting Point B. & R.....	195° F
Flash Point.....	465° F
Penetration:	
32° F.....200 gr.....60 Sec.....	18
77° F.....100 gr.....5 Sec.....	28
115° F.....50 gr.....5 Sec.....	51
Ductility @ 77° F—5 cm. per min.....	3 cm.
Soluble in Carbon Bisulphide.....	99.84%
Soluble in Carbon Tetrachloride.....	99.82%
Evaporation 7 hours @ 320° F.....	.09%

Physical Properties of GF Bitumen Saturated Fabric (GF 21)

Width unsaturated.....	37"
Width saturated.....	36"
Weight unsaturated per sq. yd.....	5 oz.
Weight saturated per sq. yd.....	14 oz.
Minimum tensile strength lengthwise per 1" width.....	70 lbs.
Minimum tensile strength crosswise per 1" width.....	50 lbs.
Flexible.....	0°-250° F.
Threads per 1".....	24
Stretch.....	10%

SPECIFICATIONS

For Waterproofing with GF Bitumen Mop Coating (GF 17) and GF Waterproof Felt (GF 18)

47—General Conditions

The waterproofing course to consist of three plies or layers (or as many plies as may be necessary for the particular work in hand) of GF Waterproof Felt (GF 18) each ply stuck and coated with GF Mop Coating (GF 17), applied hot. This waterproofing course to be carried across all wall and column footings, both interior and exterior, under all floors and partitions, including the side walls and floor of any and all pits, and up all walls in contact with the ground to grade level.

48—Materials

GF Mop Coating (GF 17) and GF Waterproof Felt (GF 18) as manufactured by The General Fireproofing Company, Youngstown, Ohio, are to be purchased direct from the manufacturers or their authorized agents, and delivered on the building site in original packages.

49—Preparing Angles

To prevent breaking, the waterproofing course shall not be applied to right angled surfaces, such as the junction between floors and walls, before such angles are sloped or coved with cement to form a firm and even bed for the application of the waterproofing. Before applying the waterproofing over a right angle corner of brick or concrete masonry, the corner shall be chipped off and smoothed up with cement mortar to give a round turn.

50—Applying Waterproofing to Footings and Through Key

After masonry surface has been thoroughly dried and cleaned of projections and foreign matter, the surface of the footing is to be brushed with GF 16 and then swabbed with hot GF 17. In this is to be embedded GF 18 of sufficient width to extend 6" on either side of the wall line. Continue this alternate swabbing and embedding of GF 18 until full three plies have been laid and each coated with GF 17 through this footing and key.

51—Wall Waterproofing

First—The 6" lap left on the outside of the wall line is to be turned up and sealed to wall with a swabbing of GF 17.

Second—After the masonry surfaces have been thoroughly dried and cleaned of projections and foreign matter, an under coat of GF 16 is to be applied over the entire surface to be waterproofed. After this coat has set, the surface to the width of one sheet of GF 18 is to be thoroughly swabbed with a good, even coat of GF 17, applied at such a degree of heat that it does not lump, but spreads evenly, after which a layer of GF 18 is to be immediately imbedded in this hot coating and carefully pressed down so that there are no wrinkles or ridges.

Third—Swab this layer of GF 18 with a thorough coating of GF 17, then lay another thickness of GF 18 over the full width of the sheet already placed, and mop this thoroughly with another coating of GF 17.

Fourth—The next layer of GF 18 is to be lapped two-thirds of its width over the preceding layer and is to be mopped in the same manner.

This method of procedure is to be continued until the whole surface is covered. After the entire surface to be waterproofed has been covered, all flashings and joints made, the entire top surface of the GF 18 is to receive a thick mop coating of GF 17, applied hot, at the rate of one gallon of GF 17 to 25 square feet of surface.

52—Application of Four Plies or More

With the exception of the direction of the layers, the preceding instructions for application are to be followed. Where four plies are used, lay two plies and two plies at right angles; where five plies are used, three plies and two plies at right angles.

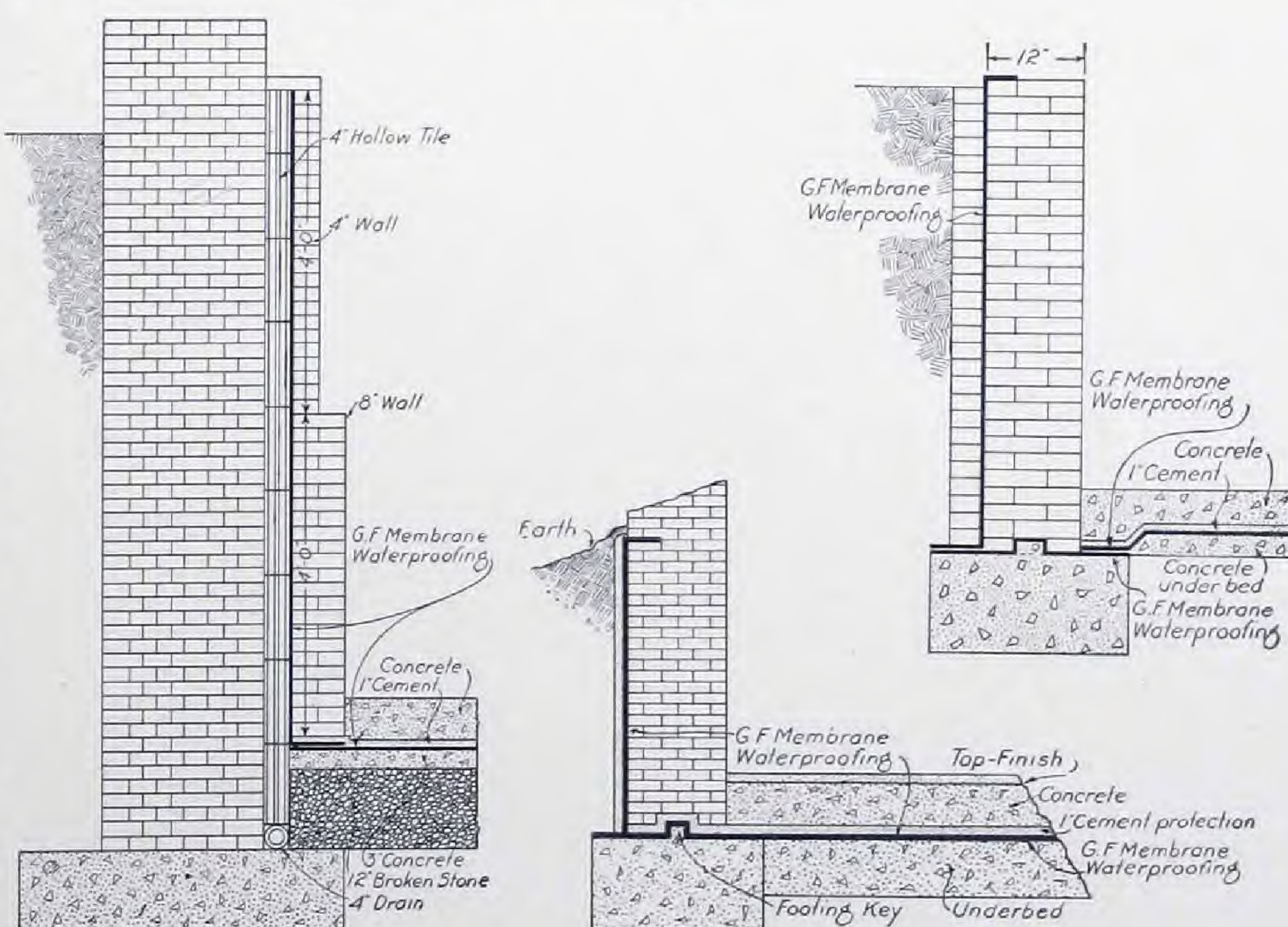
53—Laying Waterproofing Over Floors

After the concrete underbed has been cleaned, all depressions pointed up with mortar and the surface is perfectly dry, the waterproofing shall be laid as heretofore specified, great care being taken that tight joint is made between this layer at the footing lap left extending on the inside of the wall.

54—Protection of Waterproofing

After the waterproofing course over the floor and up the side walls has been finished, it shall be protected with a 1" coat of 1:2 cement mortar applied directly over the last swabbing of GF 17.

A single course of brick may be used to protect the side wall waterproofing. In case brick is used, great care should be taken in laying this brick to be sure that the waterproofing course is not punctured. If possible, the brick work should be offset 1" from the waterproofing course and this opening poured full of cement grout.



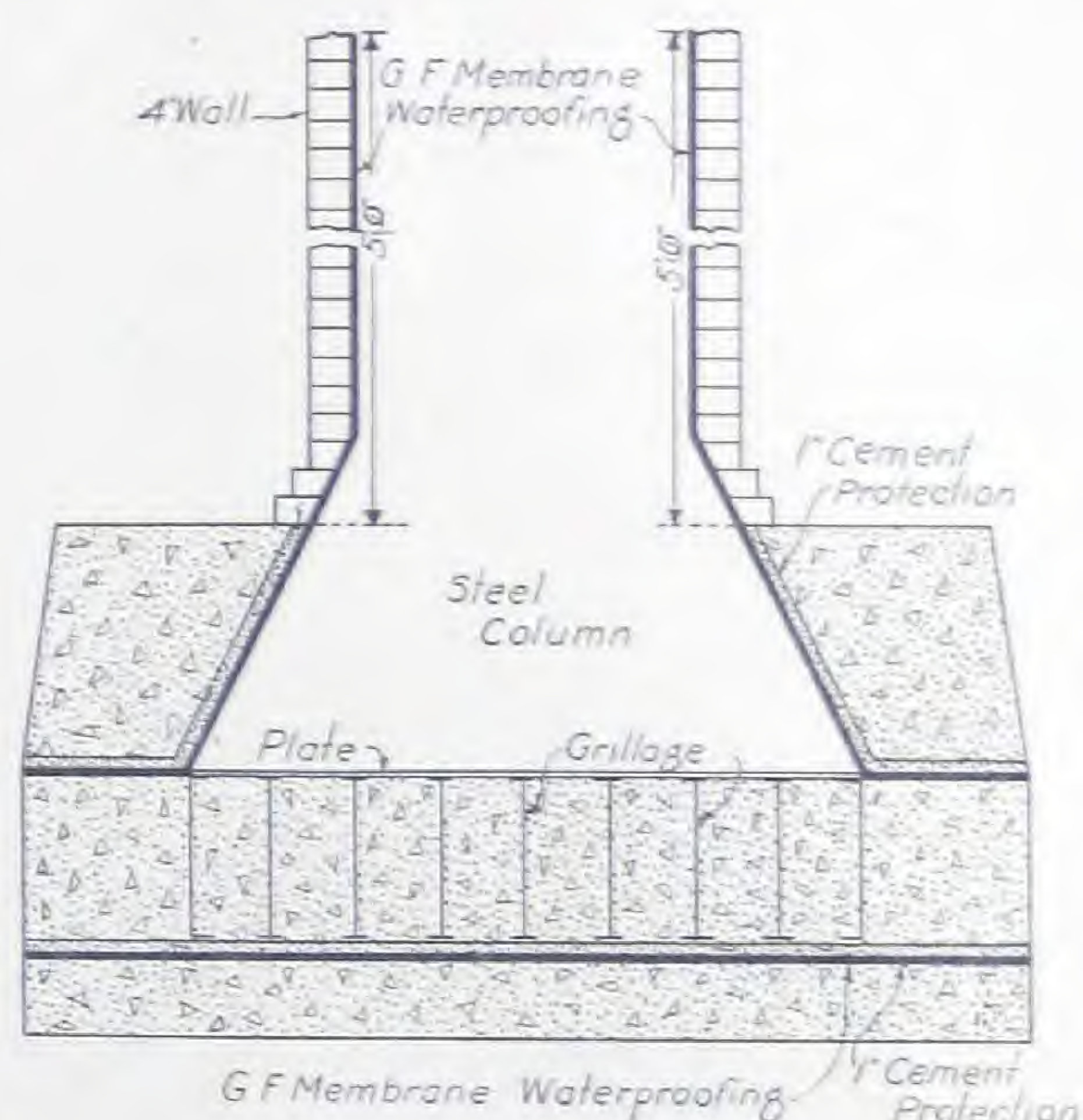
WATERPROOFING AROUND COLUMNS AND UNDER GRILLAGES

55—Waterproofing Course

After the surface to be waterproofed has been cleaned and before the grillages are set, the specified number of plies of waterproofing are to be laid on the bed where these grillages are to be set, extending the Waterproofing out over the full size of the column footing. The whole layer of waterproofing is to be thoroughly protected with 1" of mortar.

56—Filling Column Shoes

After the columns are set, the shoes are to be filled solid with Portland cement grout, the rivet heads plastered over even and smooth and the underbed of floor concrete properly smoothed and graded with Portland cement. Then lay the waterproofing over the floor, connecting it to the lap under the grillages and extend the waterproofing up the columns to the desired height above the floor (which should be at least 17" above the highest water level).



57—Protecting Brickwork

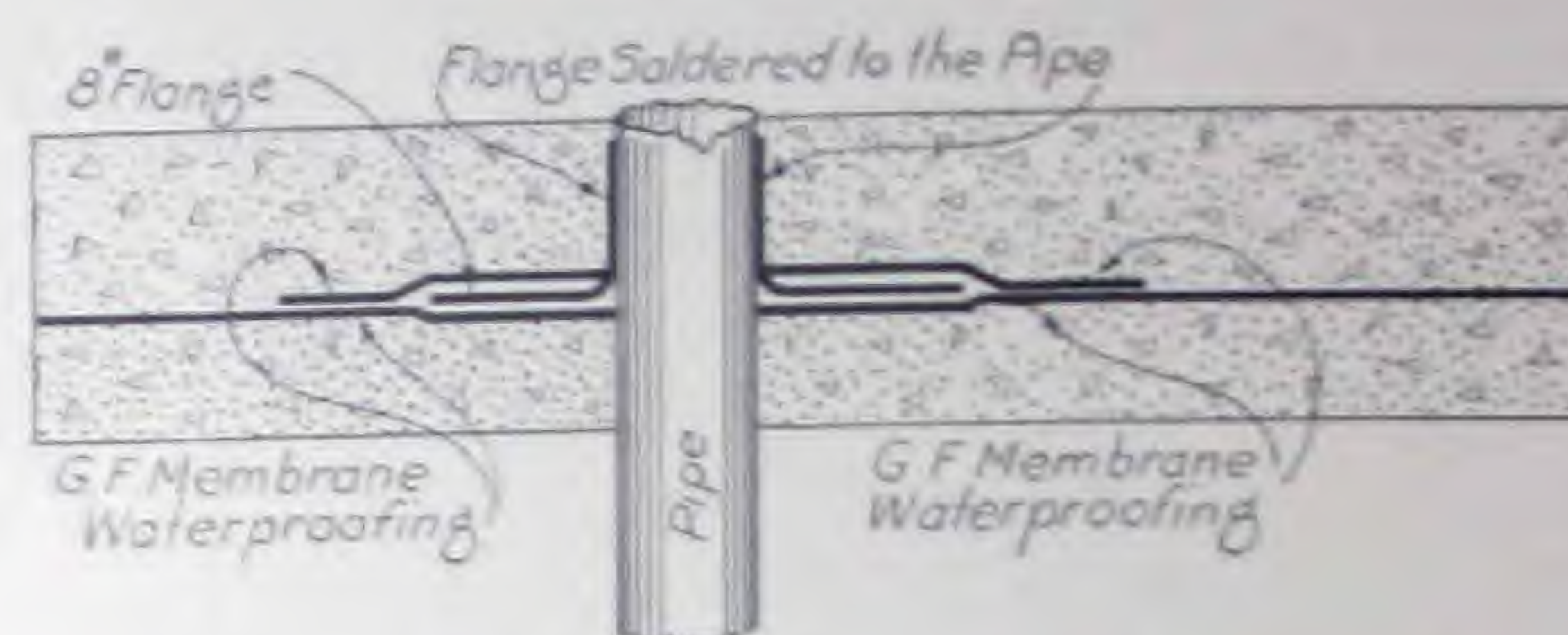
Then build protecting brickwork against the waterproofing around the column at least 8" in thickness for the first 4' in height and 4" in thickness for the balance. After this work is completed the finish course of concrete may be laid over the entire floor.

58—Connecting Waterproofing to Pipes, Conduits, Etc.

All pipes, conduits, etc., passing through the waterproofing are to have copper flanges extending 8" out on floors and 5" up on pipes or conduits. After waterproofing is installed, these flanges are to be placed with the under sides stuck to the waterproofing with hot GF 17 and then soldered to the conduits or pipes. Apply over these flanges three plies of waterproofing solidly stuck to the flanges, coated and extended 8" out on floor waterproofing.

59—Flanges for Hot Water and Steam Pipes

In the case of hot water or steam pipes the flanges must be of iron and the pipes threaded so that the flanges can be screwed onto the pipes using red lead to render the screw joints watertight. After the flanges have been screwed in place, they shall be waterproofed with three plies of water-



proofing solidly stuck to the flare of the flange and waterproofing carried out over the floor at least 8".

60—Pumping and Enclosing Pumphole

Paragraph 30 is to be carefully followed.

WATERPROOFING THE INTERIORS OF BASEMENTS, PITS AND POOLS, WITH GF 17 AND GF 18

Paragraphs 47 to 55 and 58 to 60 inclusive to be carefully followed, and

61—Protection of Waterproofing

The waterproofing course on floor, walls and columns shall be protected with a 1" coat of 1:2 cement mortar applied directly to the last swabbing of GF 17.

The wall and column waterproofing shall then be reinforced with a brick retaining wall of sufficient strength to resist the hydrostatic pressure. Great care to be taken not to injure the waterproofing, and all joints are to be well filled with mortar, using a shove joint, each course to be bedded, and particular care being taken to fill solidly the joint between the brickwork and the waterproofing.

The floor waterproofing to be reinforced with a concrete floor (1:2:4) reinforced if necessary to withstand the hydrostatic pressure.

This concrete floor to be laid before the retaining wall is built, a key being left at the walls to prevent slipping.

WATERPROOFING AROUND COLUMNS

62—Preparation and Application of Waterproofing

After the underbed of floor concrete is properly graded and smoothed off with Portland cement mortar and the rivet heads are all plastered, the waterproofing is to be laid over the entire floor, extending same up columns to a height of 2 to 5 feet (if necessary to extend higher, system previously mentioned should be used), protecting the same with 1" of mortar. Then build 4" of brickwork against waterproofing of columns and lay finish course of concrete over the floor.

WATERPROOFING SWIMMING POOLS TO RESIST INSIDE PRESSURE

General—Paragraphs 47 to 55 and 58 to 60 inclusive to be carefully followed, and

63—Application

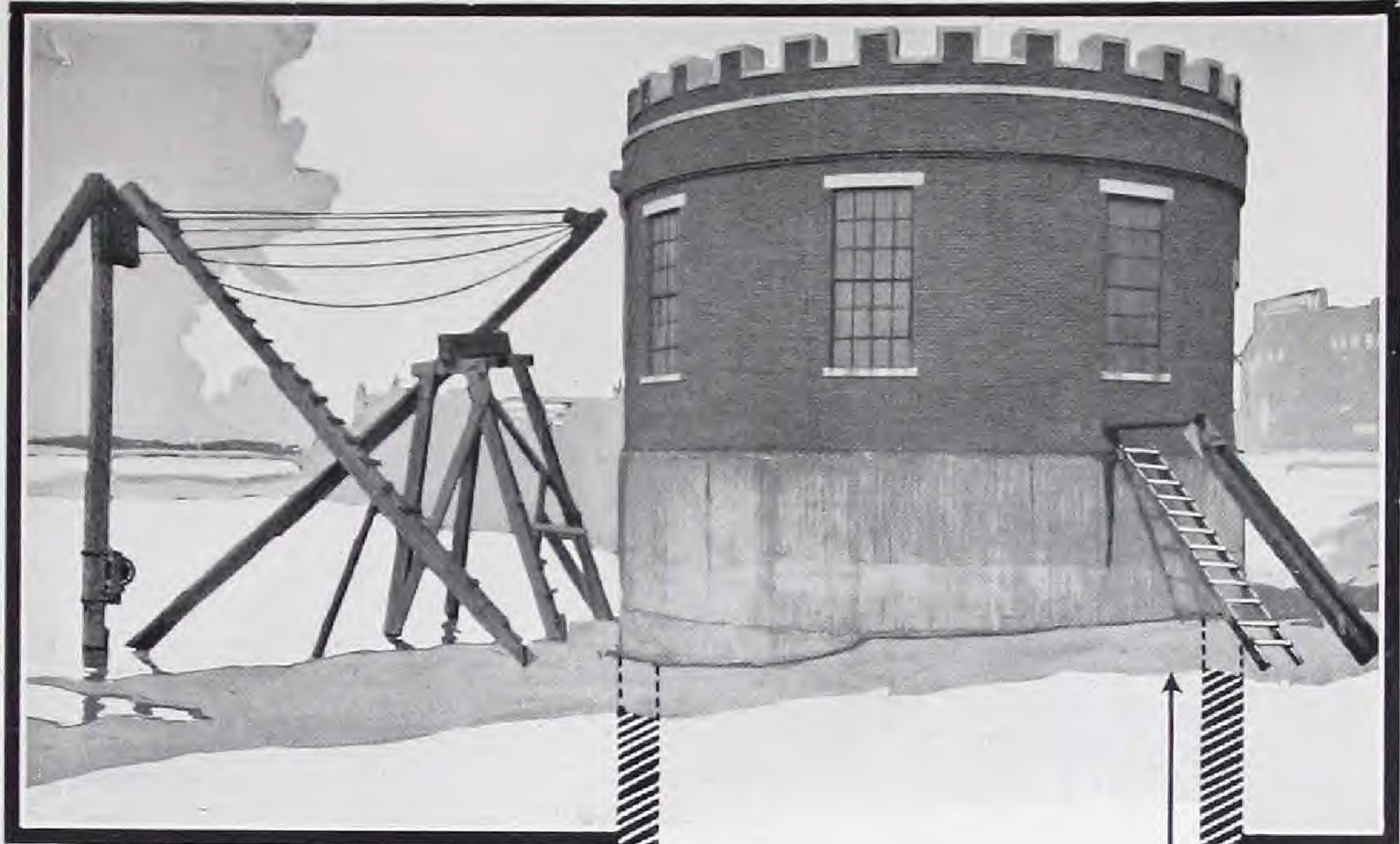
The waterproofing course is to be carried over the floor and up the sides of the pool, extending it under the platform around pool and up the walls at the side of this platform at least 6". Then the waterproofing is to be covered with a 1" coat of mortar before the concrete floor and inner lining of the pool are placed

64—Pipes

All pipes or drains passing through the waterproofing course are to have copper or screw flanges in accordance with Paragraphs 58 and 59.



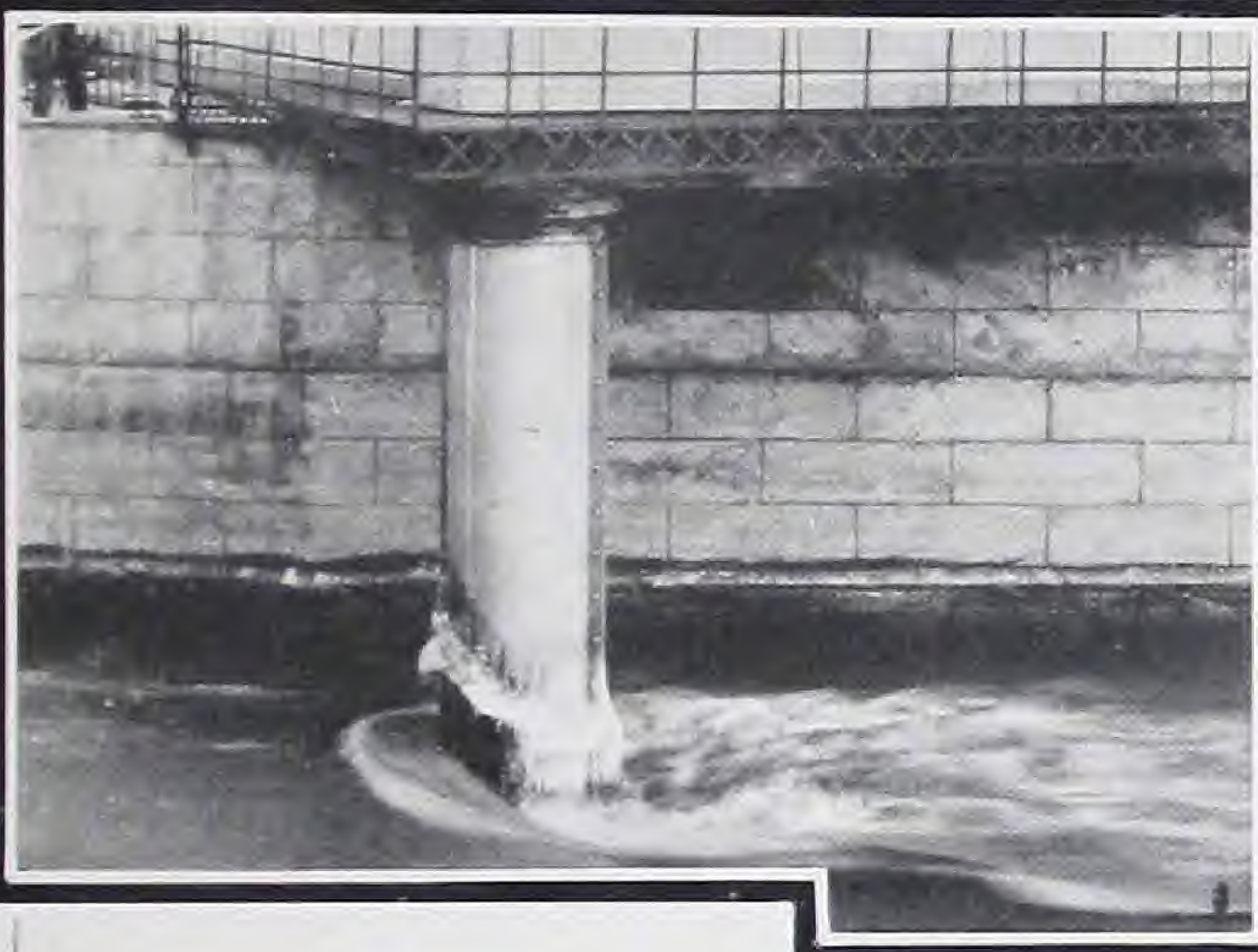
Evansville Public Utilities Co.
Well under construction.



A pump well, Public Utilities Co., Evansville, Ind., concrete walls waterproofed with GF 10.

This well is 60 ft. deep, located on the edge of a river and the bottom of the well is 5 ft. lower than the river bed. It houses pumping machinery and is bone dry.

60 FT. UNDER GROUND



Western Reserve Bank, Warren, Ohio. Foundation walls waterproofed with GF Integral Waterproofing Paste (GF 10). Above is shown a corner of the basement under hydrostatic pressure.

Below, Basement Display Room in warehouse of N. Snellenberg & Co., Philadelphia. Walls waterproofed with GF Integral Waterproof Paste (GF 10). Note character of merchandise stored.



WATERPROOFING SWIMMING POOLS AGAINST INSIDE AND OUTSIDE PRESSURE

General—Paragraphs 47 to 55 inclusive are to be followed, and

65—Application

In this construction a continuous waterproofing course must be carried under and over the floor; up the inside and outside of walls. The outside wall course shall be laid over footings before walls are placed, then carried up outside. The under-floor waterproofing should be laid on the underbed and protected before the concrete slab is poured.

The waterproofing inside the pool should be laid continuously over the floor and up the side wall. This waterproofing may be protected with plaster, brick, tile or enameled brick, as the architect may direct.

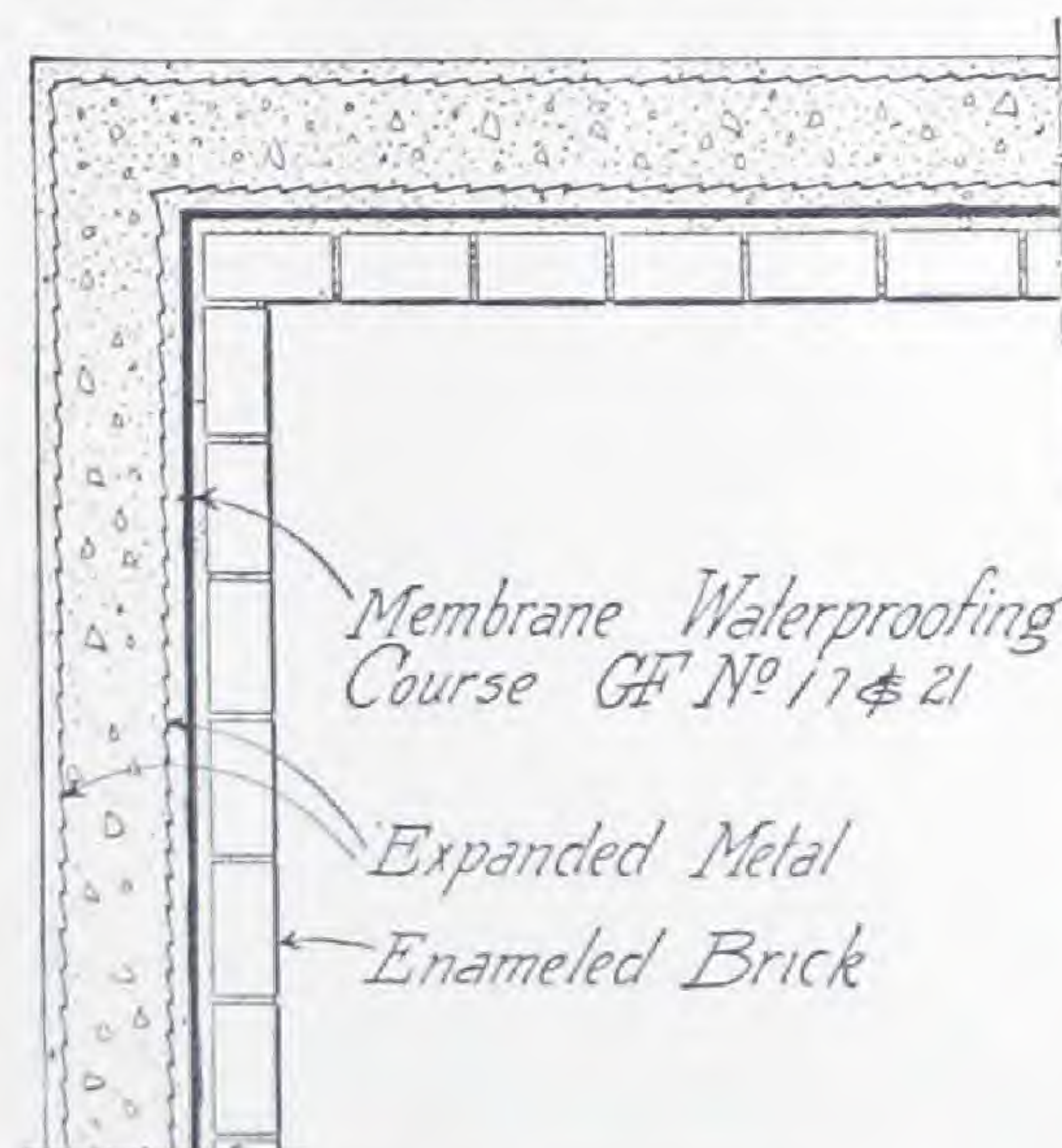
The concrete wall must be heavy enough to withstand either the inside or outside pressure.

Great care must be taken to connect the membrane very carefully to all pipes, dowels, drains or other obstructions to form a continuous course, by means of flanges as described in Paragraphs 58 to 60.

WATERPROOFING FLOORS OF MILLS, GARAGES, STABLES, ETC.

66—Wood Floors

If gutters are required, wooden boxes are to be constructed at least 2" wider and 2" deeper than the depth and width of the iron gutters, so that there may be a space for applying the waterproofing (see sketch). Over

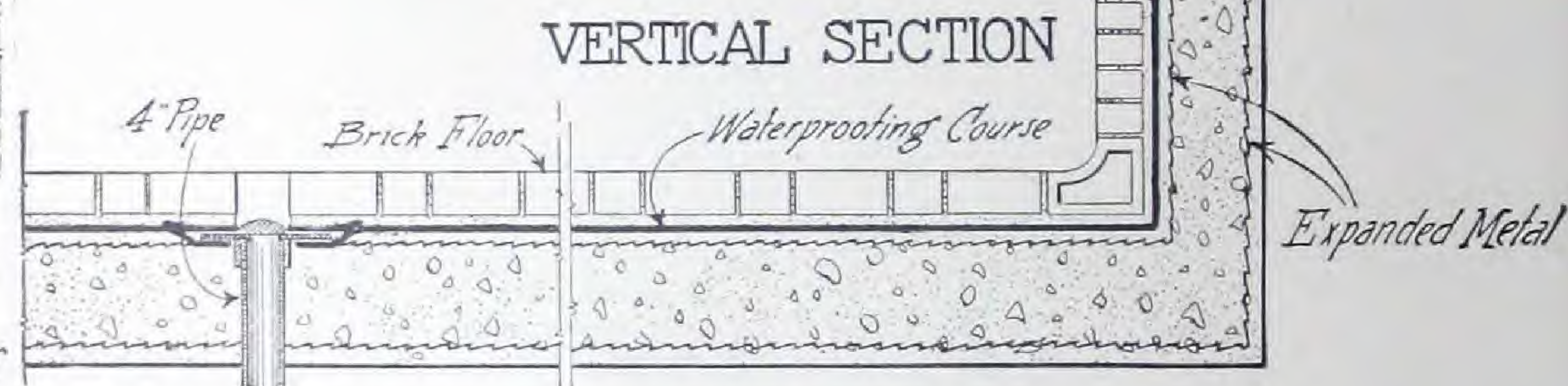


HORIZONTAL SECTION AT CORNER

the wood underfloor lay one ply of GF 18, lapping the edges 2" and nailing well with flats and nails. Then apply the number of layers of waterproofing to be used in accordance with Paragraphs 51 to 54 inclusive, extending this course down and around sides and bottoms of gutter boxes. After the iron gutters are installed, fill in under them with hot GF 17 so that the space is filled solid.

67—Laying Sleepers for Finished Floor

The sleepers for the finished flooring are to be laid and nailed at the same time the surface coating of GF 17 is being applied, the carpenters working with the waterproofers to the end that the sleepers may be embedded in the hot GF 17, and a complete bond made between the coating and the



nail so there will be no leak where the nail punctures the waterproofing course.

68—Concrete Floors

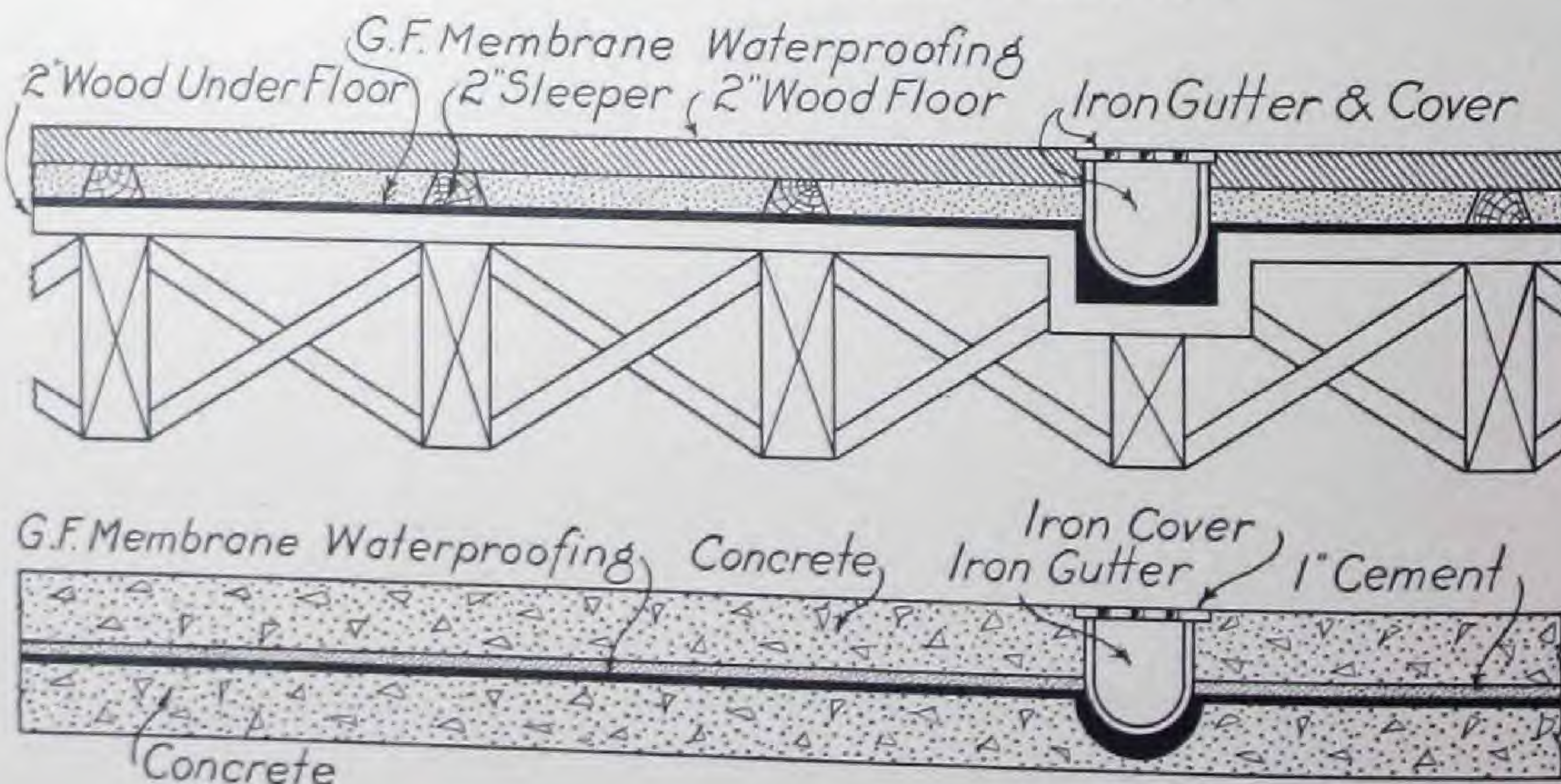
Form depressions in the concrete underbed for iron gutters which are to have copper flanges on either side at least 6" wide. These gutters are to be set so that they will come to the proper level in relation to the finished floor. After the underbed of concrete is properly smoothed and graded with Portland cement mortar lay the waterproofing over the entire floor in accordance with Paragraphs 51 to 54 inclusive, including the depressions for the gutters.

69—Setting Gutters

Set the gutters so the flanges will rest upon the waterproofing and fill space under the gutters solid with GF 17. Then bring the copper flanges of the gutter down upon the waterproofing, nailing these flanges at least every 6". Then lay three plies of waterproofing the full width of the flanges, lapping 8" out on floor waterproofing.

70—Protecting Waterproofing

Protect the entire surface of the waterproofing with 1" Portland cement mortar, and after this has thoroughly set, lay the finished concrete floor.



SUBSTRUCTURAL WATERPROOFING

DAMPPROOFING AGAINST SEEPAGE AND NATURAL SOIL DRAINAGE WITH GF 17

71—Materials

GF Bitumen Coating GF 17 as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from the manufacturers or their authorized agents and is to be delivered on the building site in original packages. It is to be applied without adulteration.

72—Preparing Surfaces

All surfaces to be coated are to be clean, dry and free from all loose particles of mortar, etc.

Wherever water is present it must be carried away by drainage or pumping so as to maintain the work in an absolutely dry condition.

73—Application

GF 17 must be applied (with an ordinary cotton yarn mop) at such a degree of heat that it will not lump when it comes in contact with cold masonry. The material must be kept at a temperature ranging from 250 to 300 degrees in the "kettle" in order to be of proper consistency.

After the surfaces have been cleaned and are absolutely dry, apply two thorough covering coats of GF 17 over the footing course and through the key, in the following manner:

First—Coat the entire footing and imbed in this coating (while hot) a layer of GF 18, allowing same to lap at least 6" either side of the wall lines.

Second—Coat this GF 18 with a thorough coating of GF 17, taking care that the GF 18 is not displaced in the operation.

Third—After the foundation wall is set in place, the lap on the outside of the footing is to be turned up and stuck to this wall with a coating of GF 17, after which two thorough covering coats are to be mopped over the outside of the wall up to grade.

74—Connection to Lap

Great care must be taken that a perfect connection is made to the lap through the footing.

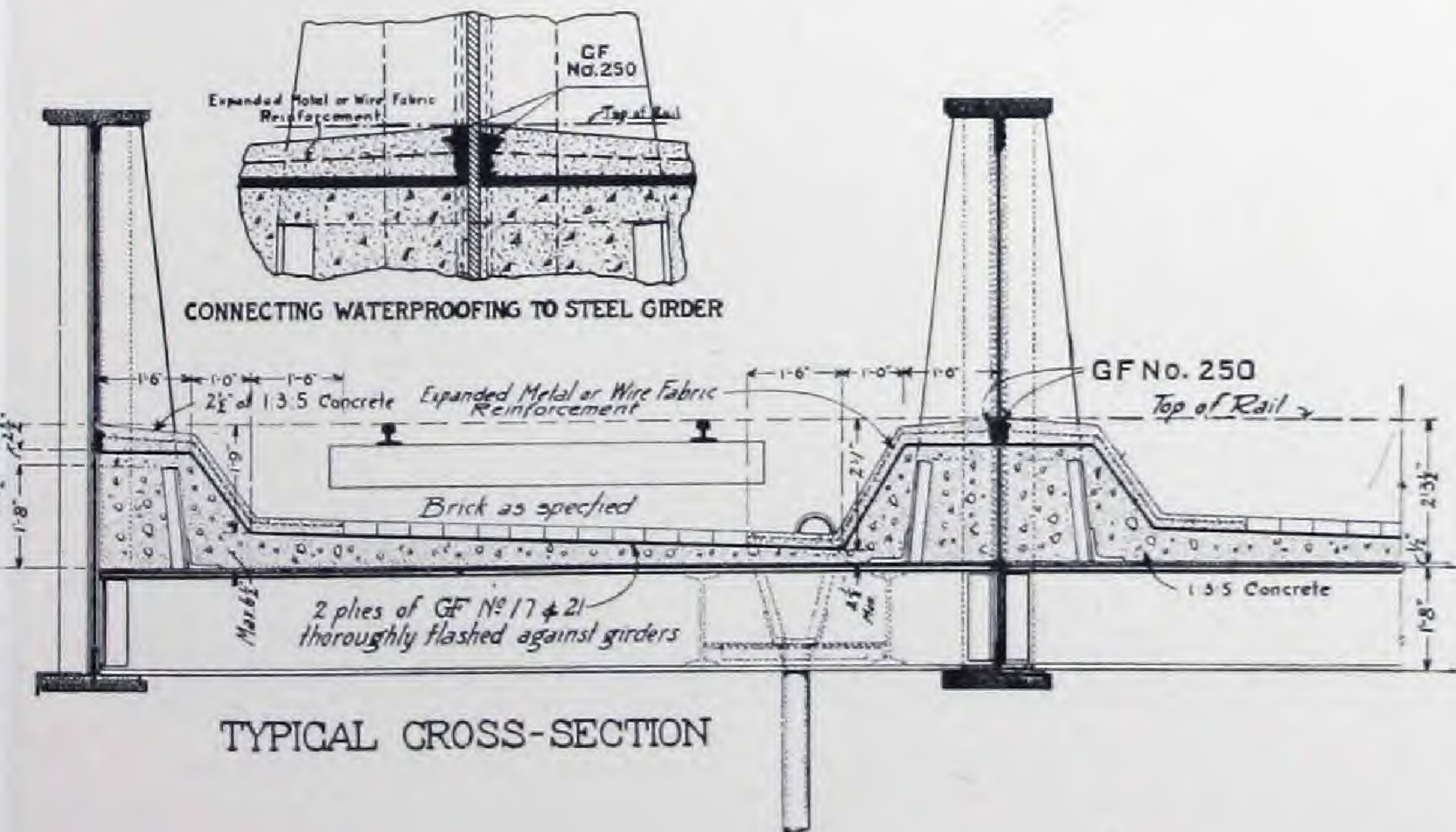
75—Floor

After the rough concrete floor has been prepared, mop two thorough covering coats of GF 17 over this surface, connecting with the laps through the footings.

After this has been done, the finish floor is to be laid over this coating. (The finish floor in no case to be less than 3" in thickness.)

WATERPROOFING WITH GF 17 MOP COATING AND GF 21 SATURATED FABRIC

76—The specifications for the application of GF 17 and GF 21 are in all cases exactly the same as those for GF 17 and GF 18, except that it is necessary to use not more than 2 plies of GF 21, and Paragraph 49, "Preparing of Angles for Waterproofing," can be omitted, as GF 21 has sufficient tensile strength and pliability to fill such angles without cracking.



WATERPROOFING STEEL DECK OR CONCRETE FLOOR BRIDGES

General—Paragraphs 47 to 55 inclusive are to be carefully followed, and

77—Construction

A. *Depth*—The depth of the steel or concrete construction shall be sufficient from the top of the rail to the top of steel or concrete floor to allow of the installation of sufficient protection of concrete or brick to prevent cutting the waterproofing by the action of the ballast.

B. *Drainage*—The surface to which the Waterproofing is applied shall be pitched so that all water washing down through to the waterproofing may be removed promptly. Where this is not done in the steel, concrete shall be laid so as to drain the water to the inlets.

C. *Inlet*—Cast iron inlets shall be set at proper places in the floor and provided with movable grated covers. The down spout from these inlets shall be provided with traps and clean-outs which shall be accessible from below the bridge.

D. *Half-Through Girder*—Where the top of the girder approximates the same height as the top of the rail, the waterproofing and protection shall cover the entire top of the girder.

E. *Apron-Plate*—The apron-plate from the steel floor over the back wall shall be provided with a curb angle against which to finish the waterproofing, and to this angle shall be riveted a vertical plate to prevent dirt from collecting under the apron-plate. The apron-plate shall slide freely on the backing wall either over a downward curved surface or a flat.

78—Protection of Waterproofing

After completion of the waterproofing the entire surface shall be covered and protected by one of the following methods:

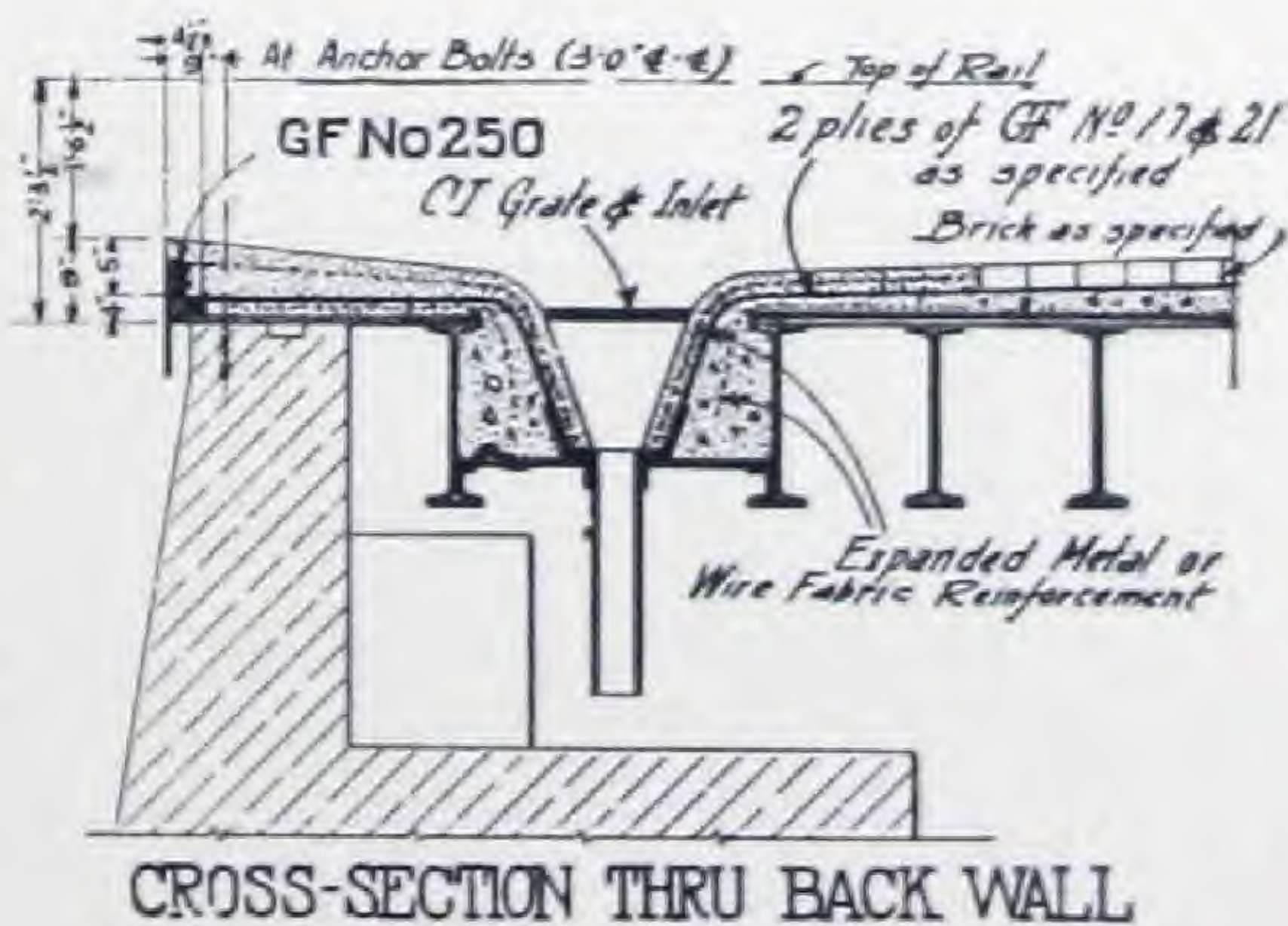
First—Straight hard burned brick laid flat, with the joints filled either with GF 17 or with cement grout in which has been incorporated GF 10.

Second—A layer of concrete from 2 1/2" to 3" thick with GF Expanded Metal Reinforcements.

79—Preparation for Waterproofing

A. *Concrete*—Wherever called for by the plans, the decks of the bridge shall be protected with 1:3:5 concrete mixed as specified and finished with 1:2 cement mortar 1/2" thick, troweled to a smooth, even surface as shown. This concrete and mortar shall be allowed to dry thoroughly so as to prevent the formation of steam when the hot waterproofing is applied.

B. *Cleaning*—All vertical or sloping surfaces of concrete or steel shall be thoroughly cleaned of dust, dirt, loose particles, paint and grease. The use of a hand bellows is recommended for cleaning of loose sand and dirt. For cleaning paint and grease and freshening the surface of the GF 17 where a junction of old and new is to be made or where a pocket of GF 250 Mastic Cement is to be used against the girders, gasoline shall be used. This may be done either by swabbing the surface with it, or, where steel is to be cleaned, pouring a small quantity over the surface to be cleaned and setting fire to it. The use of a blow torch is also recommended.



C. Painting Steel and Concrete—The surface shall then be painted with 2 coats of GF 200. The material for the first coat shall be diluted with gasoline so as to give a brownish tint. The second coat shall leave the surface a very dark brown—almost black. Both coats of paint shall be carefully applied and thoroughly worked into the surface, to give a uniform coating.

Paint shall not be applied to damp concrete or steel. The paint is to be applied immediately in advance of the waterproofing and before dust and dirt have a chance to collect after the cleaning.

D. Pouring Concrete—All concrete shall be poured as the chief engineer shall direct. It shall be of such consistency that when placed, it will not require much tamping and shall be laid to aid the watertightness of the structure, not merely as a support for the waterproofing materials. All exposed surfaces shall be troweled to a smooth, hard finish.

In cases where concrete haunching against girders is called for by the plans, forms shall be used, and the concrete shall be of a wet consistency.

80—Application of Waterproofing

On the surface prepared as hereinbefore specified, apply GF 17 and GF 21 in accordance with Paragraphs 47 to 55 inclusive.

All flashing and reinforcing around inlets and other places specified shall be carefully executed.

Waterproofing shall not be done in wet weather nor at a temperature below 32 degrees Fahrenheit without special orders from the chief engineer. The GF 21 shall be laid shingle fashion transversely to the center line of the bridge and shall be carried up the haunching and secured against

the girder by the use of an angle bolted through the girder and over the waterproofing as shown.

The finish of the waterproofing against girders or concrete shall be made with a pocket of GF 250. The surface with which this material comes in contact shall be dry, absolutely free from grease or dust, and, previous to its application, shall be covered with a thin paint of GF 200 diluted with gasoline.

Particular care shall be taken to make a tight joint around gussets, stiffeners and the ends of girders. Care shall be taken to prevent injury in any way to the waterproofing by the passing of men or wheelbarrows over it, or by throwing any foreign material upon it.

After the waterproofing course has been completed, the horizontal surfaces shall be protected by a course of straight, hard burned, dense brick, laid flat in a bed of 1:3 cement mortar with full joint. There shall be not less than $\frac{1}{2}$ " of mortar between the waterproofing course and the brick.

About 18" in width of the horizontal surface adjacent to the haunching shall be protected by about $2\frac{1}{2}$ " of 1:3:5 concrete reinforced with GF Expanded Metal.

Every care shall be taken to insure satisfactory and thoroughly watertight joints between the main layer of waterproofing and girder; special attention shall be given to stiffeners, etc. The waterproofing shall also be carried down over the back walls between the elevation of the bridge seat as shown on the plans or as directed.

Rolls of waterproofing shall be stored on their side.

Waterproofing shall be done by experienced and expert waterproofers only.



Springfield (Ill.), High School. GF 16 and GF 200 used. Helme and Helme, Architects, Springfield, Ill.
Barke Construction Co., Contractors

Waterproofing Foundations by Means of a Brush or Trowel Coating

WATERPROOFING sub-structural work against moisture and ordinary surface drainage can be done economically with a foundation brush or trowel coating. Such a coating when brushed or troweled thoroughly into all the pores and small reveals in a brick, masonry or concrete foundation, effectively repels any dampness or seepage except that from a direct head of water.

It must, however, be thin enough to spread readily under the brush or trowel and must bond thoroughly, at the same time remaining pliant to expand or contract with the wall and not crack or scale off.

GF Foundation Brush Coating (GF 16)

GF Foundation Brush Coating (GF 16) is a heavy bitumen of such consistency that it can be applied cold with an ordinary paint brush. It bonds tightly to the wall, but yields to expansion or contraction without danger to the tough film which makes up the waterproofing agent. GF 16 in connection with reinforcing layer of felt or burlap, is sometimes used to meet even more severe conditions than natural soil drainage presents.

To thoroughly protect sub-structures against surface drainage and the absorption of moisture through capillary attraction, the waterproof course must extend over the footings and on top of the underbed of the concrete floor, as well as on the outside of walls in contact with the surrounding soil. For this work the use of GF 16 is the most economical method. It does not require heating and is very easily applied.

Covering capacity of GF 16 varies from 40 to 75 square feet of surface per gallon. So much depends on the nature

of the surface to be covered that a closer general estimate cannot be made.

Shipped in

1-gallon cans
5-gallon cans
30-gallon half-drums
50-gallon drums

Shipping weight, 9½ pounds per gallon.

Labor cost

One man can apply 25 gallons per day.

GF Mastic Cement (GF 250)

GF 250 Mastic Cement is a heavy plaster material made on a bitumen base, containing asbestos fibre and vulcanized china wood oil. It is of such a nature that it does not run or dry out and crack, expanding with the surface to which applied. Can be applied to a wet surface.

Covering capacity 2 sq. ft. per lb. Shipped in 50-lb. cans; 420-lb. half-drums; 630-lb. drums. Shipping weight, 10½ lbs. per gallon.

Labor cost

One man can apply 200 pounds per day.

SPECIFICATIONS

For Waterproofing With GF Foundation Brush Coating (GF 16) or GF Mastic Cement (GF 250)

GENERAL CONDITIONS

81—Material

GF Foundation Brush Coating (GF 16), or GF Mastic Cement (GF 250) as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from the manufacturers or their authorized agents and is to be delivered on the building site in original packages. It is to be applied without adulteration.

82—Preparing Surfaces

Surfaces to be coated are to be clean, dry and wire brushed to be sure that they are free from all loose particles of mortar, etc.

83—Drainage

Whatever water is present must be carried away by drainage or pumping so as to maintain the work in an absolutely dry condition.

84—Application

After the surfaces have been thoroughly cleaned and are absolutely dry, apply two thorough covering coats of GF 16 or a trowel coating of GF 250 over the footing course and through the key.

After the foundations are built, two thorough covering coats of GF 16 or a trowel coating of GF 250 are to be brushed over the outside of the wall up to grade.

85—Floors

After the rough concrete floor has been prepared, two thorough covering coats of GF 16 or a trowel coating of GF 250 are to be spread over this surface, connecting with

the laps through the footing. The finished floor to be laid over this coating and in no case to be less than 3" in thickness.

WATERPROOFING TANKS, CISTERNS, ETC.

86—Application

After the surfaces have been prepared and cleaned, two thorough coats of GF 16 or a trowel coat of GF 250 are to be applied to the side walls and floors of (name whether cisterns, tanks, etc.) and then this material is to be protected with a lining of either plaster, brick, tile or some other covering to protect it against abrasion.

WATERPROOFING INTERIOR OF BASEMENT WALLS, INSIDE OF TANKS, OR UNDER FLOORS WITH GF MASTIC CEMENT (GF 250)

Where it is desired to proceed with the waterproofing before concrete or masonry walls, etc., have had sufficient time to dry out, they can be effectively dampproofed with a trowel coating of GF 250 Mastic Cement, as this material adheres perfectly to damp or wet surfaces and can be used in all such cases in place of GF 16.

87—Application

All holes or large cracks are to be pointed up so as to present a smooth surface upon which is then to be troweled one coat of GF 250. Care to be taken that no bare spots are left.

The GF 250 is best applied by means of a plasterer's trowel.

Treating Cement to Prevent Freezing During Setting

UNLESS suitable precautions are observed, laying concrete, brick or stone work in freezing weather is risky business. Even ordinary precautions are uncertain. Hot aggregates, for example, may cool just at the time when freezing of the concrete would be dangerous.

But *GF Cement Accelerator* (GF 12) when used as a frost preventive is always reliable. The exact amount of frost protection you put into your mixture will always be there. The rules are very simple: *To protect against three degrees of frost, use one gallon of GF 12 to each ten gallons of gauging water; for eight degrees of frost use two to ten mixture, and for fifteen degrees use three to ten.*

GF Cement Accelerator (GF 12)

There are three reasons for the action of *GF Cement Accelerator* (GF 12) as a frost preventive. In the first place, the accelerated chemical action increases the temperature of the mass. A mixture of materials at 32° F. may thus easily rise to a temperature of 38° F. In the second place, the freezing point of water treated with *GF Cement Accelerator* (GF 12) is lower than 32° F. It may, in the case of a strong solution, be even as low as 17° F. Finally, the acceleration of the setting up action decreases greatly the period during which freezing of the concrete would be dangerous.

GF Cement Accelerator (GF 12) will not corrode steel and can be used without fear in direct contact with reinforcing bars.

GF Cement Accelerator (GF 12) has a noticeable lubricating effect on the particles of the wet concrete. As the finishers say, it makes the mortar work "fatty". This causes the particles to settle closer into place. A dense concrete or mortar is always a waterproof concrete. *GF Cement Accelerator* (GF 12) thus by increasing the density of the mixture, at the same time increases its hardness and makes it waterproof.

While the principal use for *GF Cement Accelerator* (GF 12) as an anti-freeze mixture is in placing the topping of concrete floors, this by no means tells the whole story. Cement stucco can be put up with the aid of this material when there is danger of freezing. The mortar used in laying up brick in winter weather should always be treated with it. In these cases the mortar is spread so thin that it is impossible to prevent freezing by using heated aggregates, as they cannot be prevented from cooling after being placed. Of course, when *GF Cement Accelerator* (GF 12) is used as an

anti-freeze mixture with cement mortar, it still retains its property of acceleration. The size of the batches should be fixed with this condition in mind.

GF Cement Accelerator (GF 12) should be used by all cement sidewalk contractors—all of the advantages previously discussed make it particularly economical for such work.

An excellent cement grout for washing over concrete surfaces is made by mixing white Portland cement with a one to ten mixture of GF 12 and water. The wash should have the consistency of paint. The GF 12 greatly improves the grout by causing the gauging water to enter into immediate combination with the cement, rather than to evaporate.

SPECIFICATIONS

For using GF Accelerator (GF 12) for Concrete or Mortar

AS AN ACCELERATOR, WATERPROOFER AND HARDENER

As an Accelerator

The materials, mixture, method of mixing, and pouring used, will follow standard practice.

The gauging water used in mixing the concrete cement or mortar will be treated with 1 gallon of *GF Cement Accelerator* (GF 12) to each 10 gallons of water.

As a Frost Preventive

The proper amount of *GF Cement Accelerator* (GF 12) to use must be left to the discretion of the building superintendent who must anticipate the lowest temperature to be expected for two hours after the concrete or cement mortar is poured, and plan accordingly. The following proportions should be used in mixing the gauging water:

Expected Temperature	Mixture
29°	1-10
24°	2-10
17°	3-10

SECTION II—The Waterproofing Handbook

SUPER-STRUCTURAL WATERPROOFING

Describing Methods and Materials for Rendering Walls and Roofs Proof against Weathering and Dampness; for the Stainproofing of Cut Stone; for the Preservation and Beautifying of Stucco, Brick and Concrete Walls and for Filling Expansion Joints. With Specifications for the use of the Waterproofing Agents GF 10, GF 11, GF 12, GF 17, GF 18, GF 21, GF 100, GF 101, GF 200, GF 220 and GF 250.



The General Fireproofing Company Youngstown, Ohio

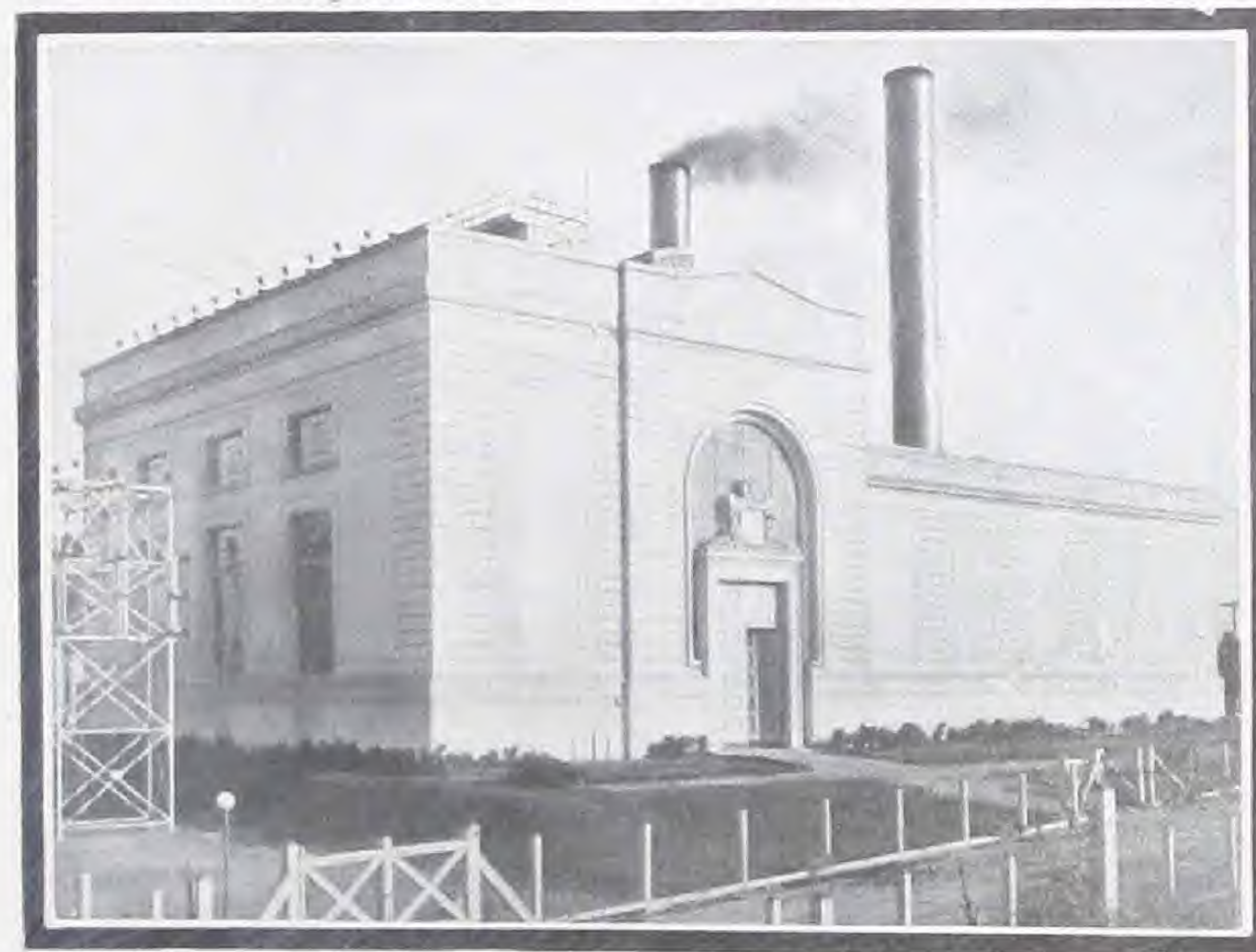
SYRACUSE CHICAGO BOSTON MILWAUKEE KANSAS CITY MINNEAPOLIS ST. LOUIS OMAHA
SAN FRANCISCO ATLANTA PHILADELPHIA NEW YORK CLEVELAND LOS ANGELES

Export Department, 438 Broadway, New York City, Cable Address "Genfire New York".

Printed in U. S. A. A 326-7



Country Home of Stoughton A. Fletcher, Indianapolis, Ind. GF Colorless Waterproofing (GF 100) used for exterior walls. Architects, H. L. Bass Co., Indianapolis. Contractors, Latham & Walters, Indianapolis.



Pacific Gas & Electric Co., River Station, Sacramento, Calif. GF Colorless Waterproofing (GF 100) for exterior.



Northwestern Life Insurance Company Building, Milwaukee, Wisconsin. GF Dampproof Coating (GF 200) used. Architects, Marshall & Fox.



Youngstown Sheet & Tube Company Houses, Youngstown, Ohio. GF Brick and Cement Coating (GF 101) used on exteriors. Architects, Conzelman, Herding, Boyd, St. Louis, Mo. Contractors, Unit Construction Co.

Specification Guide

Super-structural Waterproofing

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Waterproofing Sandlime Brick	(a) Apply Colorless Waterproofing	GF 100	37
	(b) " Tinted "	GF 101	39
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Dampproofing Exterior Stucco and Masonry Walls by Means of a Colorless Brush Coating

THE use of stucco, stone and brick exterior walls of which it is necessary to retain the original color and texture, creates the need for a transparent waterproofing which can be easily brushed onto the surface. A similar coating is used also on parapets, over copings, etc., where it is impractical to use a waterproofing course which changes the appearance of the surface.

Where swimming pools and tanks are of a light color, a colorless waterproof protection is required to keep the surfaces from stain and discoloration, in addition to the waterproofing used as a protection against water pressure.

Good results are obtained only when the compound used is absolutely colorless and remains so; when it can be easily applied without showing a streak where the coat stops, and when the coating is hard enough to prevent dirt or dust from sticking to it, causing streaks and spots.

GF Colorless Waterproofing (GF 100)

GF 100 is a thin liquid which is simply brushed onto the surface to be protected. It immediately fills the surface pores, forming a hard, durable coating that sheds water effectively and will not collect dirt or dust as coatings do which contain wax and paraffin.

With GF 100 the wall or other surface retains all of its original color and texture and when the waterproofing is carried part way down a wall no visible line is left where the coating ends. This permits the lapping of the colorless waterproofing below the line where the inner wall dampproofing ends and gives the best possible form of protection.

The use of GF 100 on exterior walls of stucco or cement block, fills the pores so completely that the usual soaked appearance after rain storms, is prevented and there is no danger of frost cracks. It prevents efflorescence on new walls and checks it on old. This condition, however, is so serious on old buildings that exact conditions should be sent to the manufacturers of GF waterproofing products and they will recommend the proper method of treatment in detail.

GF 100 is *never* to be applied when the temperature of the surface is below 60° Fahr.

The covering capacity of GF 100 varies inversely with the porosity of the surface to which it is applied, but is approximately as follows:

Covering Capacity

First coat.....	100 to 150 sq. ft. per gallon.
Second coat.....	200 to 250 sq. ft. per gallon.
Two coats.....	80 to 100 sq. ft. per gallon

(Note—Where the surface covered need not retain its original color, a cement wash applied prior to the proofing coating will increase the capacity per gallon. This serves to diminish the number of pores, cracks, and holes too small to be cared for by the "pointing up" process.)

Shipped in

1-gallon cans
5-gallon cans

30-gallon half-drums
50-gallon drums

Shipping Weight 9 lbs. per gallon.

Labor Cost

One man can apply 5 gallons per day.

SPECIFICATIONS

For applying GF Colorless Waterproofing (GF 100)

GENERAL

1—Material

GF Colorless Waterproofing (GF 100) as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from the manufacturers or their authorized agent, and is to be delivered on the building site in original and sealed packages. It must be applied as received without adulteration of any kind.

2—Application

The best results from the application of GF 100 are obtained when the temperature is about 70 degrees Fahrenheit. It must never be applied when the temperature of the wall is below 60 degrees Fahrenheit.

3—Pointing

Before any coating is applied, all holes, joints, etc., should be pointed up with GF 250 Elastic Cement so as to present an even and perfect surface over which to apply the coating.

4—Cleaning

The surface should be carefully wire brushed to remove all loose particles of mortar and any other foreign matter, including dust.

5—Method of Coating

In no case shall less than two coats of GF 100 be applied, and where the surface is very porous, apply as many additional coats as may be required to completely saturate the surface.

(Note—The porosity of the surfaces of brick, concrete and stucco varies considerably in parts, which means that in the less porous parts the particles forming the surface are packed much closer together. There are consequently less voids on the surface of such portions which, therefore, cannot absorb as much of the GF 100 as the more porous parts. It is of course impossible to locate such spots beforehand so the result is that the superfluous GF 100 will remain in the form of a film on the surface of the spots. This film will, however, dry out and fall off after exposure for a short time to the action of the sun and elements, when the surface will present a uniform appearance over all.)

SUPER-STRUCTURAL WATERPROOFING

TREATMENT OF SAND LIME, BRICK OR EXTREMELY POROUS SURFACES WHERE ORIGINAL COLOR NEED NOT BE RETAINED

General—Paragraphs 1, 2, 3 and 4 are to be carefully followed, and

6—Preparation of Surface

The wall shall be drenched with clear water and, while still wet, a thin cream made from Portland cement and water is to be thoroughly brushed over this surface. As this coating is for the purpose of filling up the small cracks and holes too small to be pointed, great care must be taken that the cement cream is thoroughly brushed into all such voids.

7—Application

After this cement wash has thoroughly hardened and is absolutely dry, brush off such of it as refuses to adhere strongly to the wall. Then proceed with the application of the GF 100. (See Paragraph 5.)

(Note—The fact that the GF 100 is designed as a small pore filler and transparent coating, explains why the application of a cement wash is advisable, when the surface is very open and porous, for the material itself has not enough body to really fill a hole or a crack as large as would admit a knife blade.)

ROUGH BRICK OR CONCRETE WALLS TO BE WATERPROOFED

General—Paragraphs 1 to 4 inclusive are to be carefully followed, and

8—Application

Two thorough saturating coats of GF 100 (or as many more as may be necessary to thoroughly fill the surface) are to be applied to (mention the surfaces). Twenty-four hours are to be allowed to elapse between coats.

CHECKING EFFLORESCENCE ON WALLS

General—Paragraphs 1 to 4 inclusive are to be carefully followed, and

9—Preparation of Surface

Brush off, without the use of water, all powdery excrecence, salts, etc., from the face of the wall. When convinced that the wall and the pointing of joints and crevices are thoroughly dry, apply a sufficient number of coats of GF 100 to completely close the pores of all weather exposed surfaces.

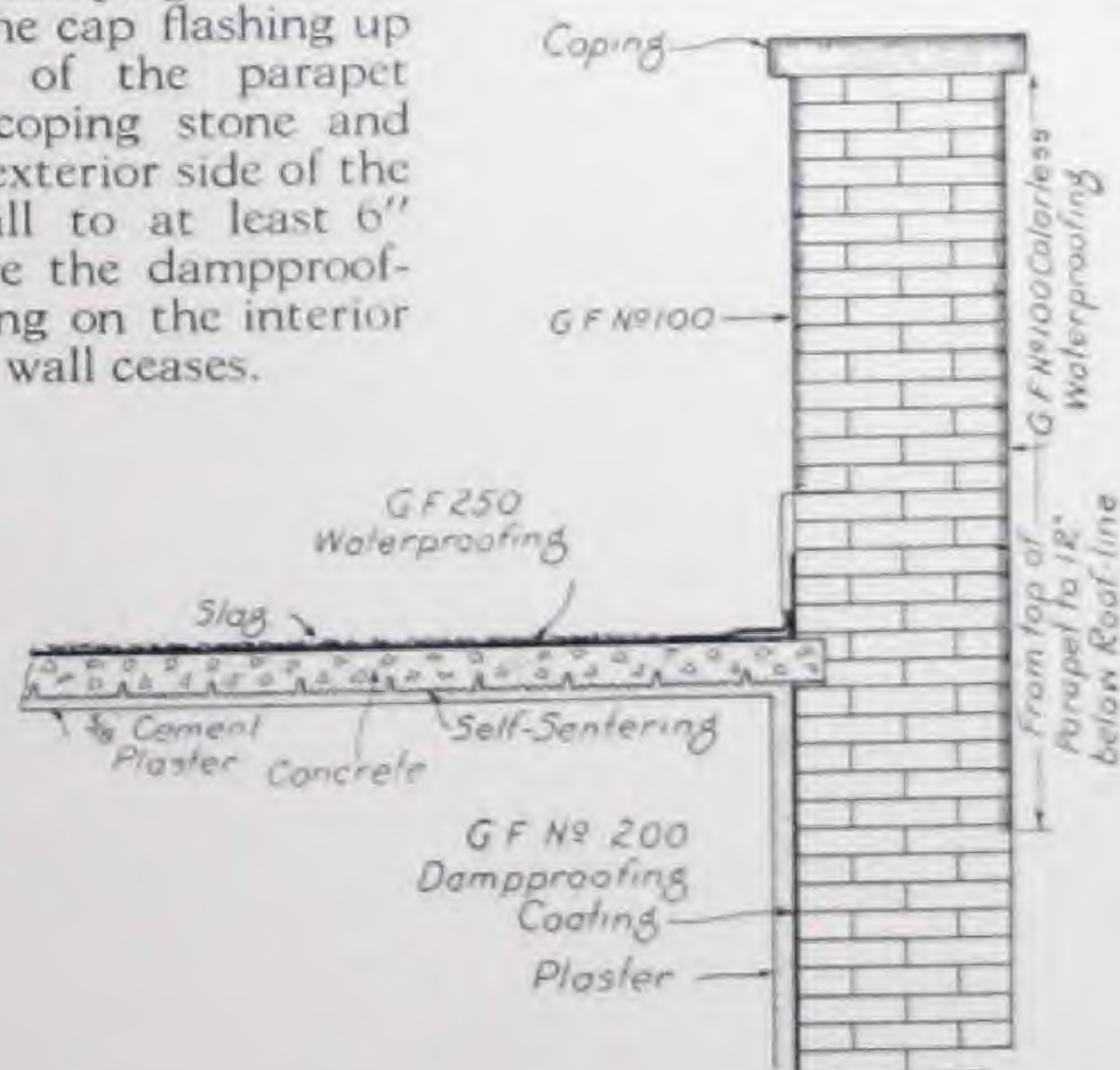
As another insurance against this trouble appearing it is absolutely necessary to caulk around doors and windows with GF Mastic Cement (GF 250).

PARAPET WALLS AND COPING TO BE WATERPROOFED

General—Paragraphs 1 to 4 are to be carefully followed, and

10—Application

Apply to both sides of parapet walls not less than two coats of GF 100, carrying this coating from the cap flashing up the back of the parapet over the coping stone and down the exterior side of the parapet wall to at least 6" below where the dampproofing or furring on the interior face of the wall ceases.



INTERIOR SURFACES OF CONCRETE OR BRICK CONTAINERS TO BE WATERPROOFED

General—Paragraphs 1 to 4 inclusive are to be carefully followed, and

11—Application

Apply to the interior surface of the container to be waterproofed, two coats of cement wash of cement and water, made in the consistency of a thin cream. After this has cured, brush off all material that does not adhere strongly to the wall or floor, and apply not less than two coats of GF 100, allowing the usual time of twenty-four hours to intervene between coatings.

(Note—This material should be allowed to set as long as possible before it is subjected to pressure on the inside of the tank, as it takes several days for it to reach its maximum strength).

EXTERIOR SURFACES OF CONCRETE OR BRICK CONTAINERS TO BE WATERPROOFED

The exterior surfaces of all concrete or brick containers exposed to the weather should be waterproofed to prevent absorption of water which will cause spalls and cracks from which leaks will develop even if the interiors are waterproofed.

12—Application

All cracks and open joints shall be raked out and pointed up with GF 250 Elastic Cement, colored, and the whole surface then treated with two brush coats of GF 100, allowing an interval of twenty-four hours between coats.

The surfaces must be properly clean and dry when the GF 100 is applied, and it is never to be applied when the temperature of the surface is below 60° Fahrenheit.



Fourth National Bank, Wichita, Kansas.
GF Colorless Waterproofing (GF 100) for Waterproofing
Exterior Walls. Architect, Henry Alfred Co., Chicago.
Contractors, Swanson Construction Co., Kansas City.

Dampproofing and Decorating Brick and Cement Exteriors by Means of a Tinted Brush Coating

THE widespread development of stucco and cement exteriors for buildings of every character has created a demand for a coating which can be successfully used over such surfaces, not only to waterproof the walls, but to preserve their texture and equalize the uneven appearance due to variation in material and application; in many cases to add also a color or tint for artistic effect.

The use of ordinary paint with linseed oil cannot be made satisfactory over masonry surfaces. The oils will combine immediately with the alkalies in the cement, forming a saponified compound, which is soluble in water, and continued rainstorms will eventually destroy this coating.

Efforts have been made to overcome these troubles by the use of various chemicals intended to change alkali into an inert material. But the varying density of each wall meant that a different solution was necessary for different parts of the surface. Where the solution was not exactly sufficient to neutralize the alkaline action, it weakened the bond of the cement and chipping and scaling of the paint film and cement was the result.

Other experiments have been made with solutions of various materials such as zinc, alum, etc., but these also weaken the bonding power of the cement, and at the same time introduce moisture under the surface which must be allowed to thoroughly evaporate before any coating can be applied.

GF Brick and Cement Coating (GF 101)

After careful research and analysis GF Brick and Cement Coating (GF 101) has been scientifically compounded. The pigments and vehicle are not affected in any way by the constituents of cement—they have, on the other hand, a decided affinity for them. This coating is both waterproof and decorative; can be applied to brick, tile and stone as well as cement, and penetrates the pores to an extent that it becomes an integral part of the surface without in any way destroying its texture. It overcomes any lack of uniformity in surface shading, and gives a soft, flat finish of the desired hue.

GF 101 will adhere tenaciously, and sets hard enough to resist the action of the elements. Yet it retains the elasticity necessary to conform to expansion or contraction stresses in the wall itself.

Furnished from stock, either flat or gloss finish, as follows:

White	Portland Gray
Old Ivory	Concrete Gray
Buff	Tile Red
Bedford Gray	Brownstone

Covering Capacity

First coat,	125 to 150 sq. ft. per gallon.
Second coat,	200 to 250 sq. ft. per gallon.
Two coats,	85 to 100 sq. ft. per gallon.

Shipped in

1-gallon cans
5-gallon cans
30-gallon half-drums
50-gallon drums.

Shipping Weight

14½ pounds per gallon.

Labor Cost

One man can apply 5 gallons per day.

Preparation of GF 101 for Application

The contents of the can should be thoroughly stirred with a paddle until the pigment is thoroughly mixed with the liquid and the contents are of an even consistency.

Surplus liquids should be poured off into another container. The contents of the can must be thoroughly stirred, adding the liquid poured off until it is all returned. To avoid evaporation, simply keep the can covered when not in use.

For priming coat over new and unpainted surfaces, add 1½ pints of Special GF 101 liquid to each gallon of GF 101. This is equivalent to adding 1 gal. of Special GF 101 to each 5-gals. of GF 101. This priming coat is to be brushed well into all pores of surfaces.

A cold wall will prevent the penetration of the coating. Do not attempt to apply GF Cement and Masonry Coating (GF 101) when the temperature of the surface is below 60° F.

Wherever a tank or a container is waterproofed the coating should be permitted to cure for at least three days before the receptacle is filled with water. If the work is done during damp or muggy weather, even a longer period should elapse.

SPECIFICATIONS

For Applying GF Brick and Cement Coating (GF 101)

GENERAL

13—Material

GF Brick and Cement Coating (GF 101), as manufactured by the General Fireproofing Company, Youngstown, Ohio, must be purchased from the manufacturers direct or from their authorized agents. The material must be delivered on the site in original packages and applied according to the manufacturer's directions.

14—Stirring

The GF 101 must be thoroughly and frequently stirred to keep the pigments in suspension. Neglect of this precaution will result in an uneven coating which will greatly mar the appearance of the finished work.

15—Preparation of Surface

The surface to receive this coating must be clean, dry and any particles of foreign matter must be removed by wire brushing or scraping before the coating is applied, and all cracks pointed up with GF 250 Elastic Cement.

16—Preparation of Previously Painted Surfaces

A surface that has been previously painted with GF 101 must be thoroughly wire brushed so as to remove all loose particles. Any other previous paint coatings must be entirely removed, which is best done with either a blow torch and scraper or a reliable paint and varnish remover.

17—Weather Conditions

Owing to the nature of GF 101, weather conditions must be considered. A temperature of 70 to 80° F. is most favorable and it must not be applied when the temperature is below 60° F. To obtain the best results it should not be applied at a time of excessive humidity.

18—Application

Apply at least two coats of GF 101 of the desired color with an interval of 24 to 48 hours between coats. Two coats of GF 101 are necessary to obtain an even colored job. Occasionally more coats are necessary, in which cases, these additional coats are to be applied at the same interval.



Dickinson School of Law, Carlisle, Pa. Architect, R. R. Markley, Harrisburg.
The basement walls of this building are protected by GF Cement and Masonry Coating (GF 101). Cement floors are hardened with GF Crystalrox (GF 145).



City Realty Company's Development, Baltimore, Md. GF Damp-proof Coating (GF 200) used.



Hack Building, Baltimore, Md. GF Dampproof Coating (GF 200) for interior walls. Contractors' Consolidated Engineering Company



Sinclair Building, Tulsa, Okla. GF Dampproof Coating (GF 200) used.



Calvary Mausoleum, Toledo, Ohio. GF 200, GF 220 and GF 10 used for waterproofing and dampproofing. Architect, A. DeCurtins, Lima, Ohio. Contractor, T. R. Sliemers, Lima, Ohio.

Dampproofing Interior Surfaces of Exposed Walls

DAMPPROOFING Coatings are applied to walls which are later plaster finished, for two reasons. First—to maintain sanitary quarters, which is not possible when dampness gets through into the atmosphere of the room or is constantly present in the walls. Second—to prevent streaking and discoloration due to moisture seeping through along the line of the furring.

The application of this dampproofing material directly upon the surface to be plastered makes necessary a compound with a strong "tack" to aid in bonding the plaster. And the dampproofing to be effective must expand and contract with the wall itself without cracking. Further than this, permanent dampproofing qualities are necessary, for a job once finished cannot be repaired or renewed except at great cost.

GF Dampproof Coating (GF 200)

GF 200 is intended for use only above grade and should not be used for dampproofing substructures.

GF 200 a viscous black coating which is applied with a brush—not to the permanently exposed surfaces, but as a furring coating between the wall and the lime plaster finish. It has the tough, elastic characteristics of any strong bituminous base, which adapt it to expansion and contraction and keep it from drying out and becoming brittle.

The strong "tack" of GF 200 when set, is retained for a period of 30 days so that it may be plastered upon any time from a day to a month after application, with equally good results.

As an insulator to maintain uniform temperature and dry air in a building, GF 200 is applied to the rough wall before the furring is put up. This keeps the air space formed by the furring, dry at all times, affording the best possible insulator against the passage of heat, cold and dampness.

GF 200 prevents efflorescence and staining by effectively barring the moisture which combines with salts and alkali in mortar to cause these forms of discoloration. Where wood trim is erected over green masonry or walls which may become damp occasionally, a coating of GF 200 on the back of the trim will prevent warping, cracking and staining.

In all of the uses named above GF 200 forms an easily applied and absolutely permanent waterproof film. The covering capacity of GF 200 varies with the smoothness of the surface being covered.

Note—GF 200 is never to be used on any surface intended to receive a Portland cement finish. Neither is it to be applied to cement surfaces, unless a mechanical bond for the plaster finish is provided by chipping and roughening the cement surface.

Covering Capacity

First coat.....	75 sq. ft. per gallon
Second coat.....	100 sq. ft. per gallon
For two coats.....	50 sq. ft. per gallon

Labor Cost

One man can apply 30 gallons per day.
GF 200 can be effectively and economically applied by means of a spray.

Shipped in

1-gallon cans
5-gallon cans
30-gallon half-drums
50-gallon drums

Shipping weight

9½ pounds per gallon.

SPECIFICATIONS

For Applying GF Dampproofing Coating (GF 200)

GENERAL

19—Material

GF Dampproofing Coating (GF 200), as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from the manufacturers or their authorized agents, and is to be delivered on the building site in original packages. It must be used without the addition of any thinning agents or any adulteration.

20—Pointing

All large holes must be pointed up to provide a smooth surface.

21—Application

Two thorough covering coats of GF 200 are to be applied to (name surface), twenty-four hours being allowed between coats. These coats must be absolutely continuous and perfect in every respect.

The coating is to be carried into all chases and reveals and well brushed into all recesses and joints.

22—Intersecting Angles

The intersecting angles of all walls and floor slabs coming in contact with weather exposed walls shall be carefully coated, the coating being carried out from the wall not less than 18" on all such intersecting walls or floor slabs.

23—Plastering

Lime plaster may be applied over surfaces covered with GF Dampproofing Coating (GF 200) within an interval of from one to thirty days.

TRIM IN CONTACT WITH MASONRY OR PLASTERED SURFACES

24—Application

The back of all trim shall receive a heavy coat of GF 200 before it is erected. This coating may be applied either at the plant where the trim is manufactured or on the job immediately before it is erected.

Stainproofing Unexposed Surfaces of Marble, Limestone or Sandstone

WHEREVER limestone, marble and other light colored and expensive building stone is used it becomes necessary, from the standpoint of economy and beauty, to protect them against unsightly stains, which often appear. These stains are caused by the absorption of salts and other coloring matter from the backing walls and will invariably work through to the surface unless the stones themselves are carefully stainproofed.

That architects realize the danger from this source is evidenced by the fact that they sometimes specify a non-staining cement for the setting of such stone. This is good as far as it goes, but it has been demonstrated time and again that to protect stone from stains from the cement mortar used in laying the backing, some means must be used to repel not only dampness but acids and alkalies as well.

GF Stainproof Stone Backing (GF 220)

GF Stainproof Stone Backing (GF 220) seals the pores of the stone tightly, which is the only sure method of making them absolutely water and stainproof.

GF 220 is also used as an extra precaution in conjunction with non-staining cement or lime, because its strong moisture-repelling qualities overcome the staining tendency of unevenly applied cement. It contains no penetrating oils of any kind—in fact, GF 220 simply adheres the surface of the stone, forming a strong film which thoroughly seals all the surface pores.



Covering Capacity

First coat.....	75 to 100 sq. ft. per gallon
Second coat.....	125 to 150 sq. ft. per gallon
Two coats.....	50 to 65 sq. ft. per gallon

Labor Cost

One man can apply 5 gallons per day.

GF 220 can be applied economically and effectively by means of a spray.

Shipped in

- 1-gallon cans
- 5-gallon cans
- 30-gallon half-drums
- 50-gallon drums

Shipping weight

9½ pounds per gallon.

SPECIFICATIONS

For Applying GF Stainproof Stone Backing (GF 220)

GENERAL

25—Materials

GF Stainproof Stone Backing (GF 220), as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from the manufacturers or their authorized agents, and is to be delivered on the building site in original packages. This material must be applied without addition or adulteration.

26—Preparing Surfaces

The surfaces of the stone are to be cleaned and dried thoroughly before receiving the coating.

27—Application

All unexposed surfaces of the stone to be thoroughly covered to within 1" of the edge of the face with two coats of GF 220, twenty-four hours to elapse between coats.

The coating thus applied must become completely dry before the stones are handled.

28—Coating Stone after Erection

After the stone has been set in place, and before the backing is carried up, the unexposed surfaces and joints shall be given a thorough covering coat of GF 220.

Dampproofing Stucco Walls by Means of an Integral Waterproofing

THE artistic use of cement stucco is one of the characteristics of modern architectural development.

This material, like all other exterior masonry, is improved by being weatherproofed. Where stucco is applied over wood lath or tile, it is always well to waterproof the stucco in order to offset in a measure the tendency of the stucco to become streaked or mottled due to the unequal absorption of water.

While the use of Metal Lath will prevent the streaked and mottled appearance of the stucco and give a uniform and pleasing finish, it is still advisable to waterproof the stucco in order to prevent disintegration due to water seepage and subsequent chemical or frost action. Also to prevent staining and discoloration due to the carrying of dirt, soot, etc., into the surface by absorption of rainwater.

Best results are secured by waterproofing the final coat of stucco with GF Integral Waterproofing Paste (GF 10) or GF Integral Powder (GF 11). By final coat is meant the last coat which is uniformly applied with the trowel, and does not include spatter dash or other similar finish coats.

To obtain the best results on stucco work and prevent checking and hair cracks the final coat should not be put on until after a lapse of at least 10 days, during which time the surface should be frequently wet down (daily if possible). When applying the final coat, all checks and cracks should be cut out and filled.

GF 10 is mixed with the gauging water (1 to 17), GF 11, 2 lbs. to each bag of cement. It therefore requires 4 lbs. of GF 10 or 6 lbs. of GF 11 to waterproof 100 sq. ft. of final coat.

GF 10 Shipped in	Shipping Weight
8-lb. cans	9½ pounds per gallon.
40-lb. cans	
240-lb. half-barrels	GF 11 Shipped in
400-lb. barrels.	50 lb. bags.

SPECIFICATIONS

For Dampproofing Stucco to be applied to Trussit, Self-Sentering, Herringbone Metal Lath, Wood Lath, Brick or Tile

29—Materials

A—Waterproofing

GF Integral Waterproofing Paste (GF 10), or GF Waterproofing Powder (GF 11), as manufactured by The General Fireproofing Company, Youngstown, Ohio, are to be purchased direct from them or their authorized agents, and must be brought to the building site in original and sealed packages. This paste or powder must be used without adulteration and in accordance with the manufacturer's specifications and directions.

B—Cement

All cement shall be a high grade Portland Cement meeting satisfactorily the requirements of the Standard Specifications of the American Society for Testing Materials. It shall preferably be so ground that eighty per cent (80%) shall pass a standard two hundred (200) mesh sieve.

C—Sand

All sand shall be free from oils, loam, clay, vegetable or other deleterious organic matter and uniformly graded from coarse to fine in size.

30—Mixing

The mortar for the scratch coat shall consist of one part Portland Cement to two and one-half parts clean, sharp sand and 1½ pounds of hair to each bag of Portland Cement. If Hydrated Lime is used, it shall be not in excess of one-third of the volume of cement.

For back-plaster coat the mortar shall consist of one part Portland Cement to two and one-half parts of clean, sharp sand, and GF Integral Waterproofing Paste (GF 10) or GF Integral Powder (GF 11).

The final coat shall consist of one part cement, two and a half parts of clean, sharp sand, and GF 10 shall be added to the tempering water in the proportion of one gallon of GF 10 to each 17 gallons of water, or two pounds of GF 11 Powder to each bag of cement.

31—Application

The plastering shall be carried on continuously in one general direction, without allowing the plaster to dry at the edge. If it is impossible to work the full width of the wall at one time, the joint should be at some natural division of the surface, such as a window or door.

The first coat shall be applied to the outside of the lath and passed through sufficiently to give a good key. Over the face of the studs the plaster shall be forced well through the lath in order to fill entirely the space between the lath and the stud. The backing coat shall be applied to the back of the lath and shall be thoroughly troweled so that the lath shall be entirely covered. The final coat shall be applied to the face of the first coat.

32—Roughing

Soon after applying and before the initial set has taken place, the surface of the first coat shall be roughened with a saw-tooth paddle or other suitable device to provide a good bond for the final coat.

33—Dampening

Before applying mortar the surface of the preceding coat shall be thoroughly saturated to prevent absorption of water from the fresh mortar.

34—Thickness of Coats

The first coat shall be at least ¾" thick over the face of the lath and project through behind the lath about ¾". The backing coat shall increase the thickness behind the lath to not less than 5/8". The final coat shall be not less than ¾" thick.

35—Drying Out

The final coat shall not be permitted to dry out rapidly and adequate precaution shall be taken, either by sprinkling frequently after the mortar has set hard enough to permit it or by hanging wet burlap over the surface to keep the surface of the stucco damp.

36—Freezing

Stucco shall not be applied when there is likelihood of freezing.



Noelting Residence, Evansville, Ind. Stucco waterproofed with GF 10. Architect, Fritz Anderson, Evansville.



Residence of R. H. Edmonds, Daytona, Fla. Stucco waterproofed with GF 10. Architect, J. S. Willis, Baltimore.



Citizens National Bank, Evansville, Ind. GF Mastic Cement (GF 250) used.



Swimming Pool, Evansville, Ind. Walls of enclosure waterproofed with GF Integral Waterproofing Paste (GF 10).



Third Regiment Minnesota National Guard and Naval Militia Armory, Duluth, Minn. Roof waterproofed with GF Mastic Cement (GF 250). Kelly & Williams, Architects.

Waterproofing Roofs

THERE are a great many uses for waterproof cement, such as pointing between copings or flashings and walls, for joints between vault lights, imbedding hip rolls and ridgings, pointing up valleys where close fits are not possible, and around leaky chimneys—in fact, wherever joints or cracks in masonry must be protected against water penetration.

GF Mastic Cement (GF 250)

GF 250 is a plastic waterproof cement which can be easily troweled onto a horizontal or vertical surface and adheres to it permanently, hardening into a firm, durable coating. It is so constituted that there is no danger of cracking even in zero weather nor of running under severe heat. As asbestos fiber is used as a binder in GF 250, it is particularly valuable as a filler for joints and as a covering for concrete roofs.

The same material is also used in combination with oakum for waterproofing joints around door casings, window frames, skylights and dormers; and as a plastic coating easily applied, for concrete roof covering to save the expense of a built-up composition roofing.

It is also used over shingles, tin, canvas, ready roofing, slate, tile or concrete, and adheres readily to all.

In any case the cement will be pliable upon application and will set into a strong, watertight joint or coating, which will expand or contract readily with the material to which it is applied.

Because GF 250 never sets hard, it may catch enough dirt and dust to form a film over the surface. Where for appearance sake, this is undesirable, slag, pebbles, crushed brick, marble, granite or colored sand may be rolled into the finished surface to give an artistic treatment.

It is best applied with a plasterer's trowel.

It is furnished in black, brown, red, gray, green and buff. On a reasonably smooth surface GF 250 will cover approximately 20 sq. ft. of surface per gallon or 2 sq. ft. per lb.

On all surfaces except metal a coating of GF 250 Primer must be first applied. GF 250 Primer will cover 50 sq. ft. per gallon.

Labor Cost

One man can apply 30 gallons GF 250 Primer per day.
One man can apply 20 gallons GF 250 on walls per day.
One man can apply 50 gallons GF 250 on roof per day.
One man can caulk 10 ordinary windows per day.
For caulking window frames, 1 gallon of GF 250 will caulk 8 ordinary sized windows.

Shipped in

1-gallon cans
5-gallon cans
30-gallon half-drums
50-gallon drums.
Shipping weight, 15 pounds per gallon.

SPECIFICATIONS

For Applying GF Mastic Cement GF 250

GENERAL

37—Material

GF Mastic Cement (GF 250), as manufactured by The General Fireproofing Company, Youngstown, Ohio, must be purchased direct from the manufacturers or their authorized agents. This material must be delivered on the building site in original packages. It must be applied according to the manufacturer's directions, without addition or adulteration.

38—Preparation of Surface

The surface is to be thoroughly wire brushed, so as to remove all loose particles, scale, mortar, etc., and leave the surface in a firm and solid condition. All large holes or cracks are to be pointed with cement mortar before the coating is applied.

39—Application of Primer

Before applying GF 250, the entire surface is to be given a liberal brush coat of GF 250 Primer, brushing same well into the pores being careful to thoroughly cover all voids and cracks.

WATERPROOFING BRICK OR CONCRETE WALLS

General—Paragraphs 37 to 39 inclusive

are to be carefully followed, and

40—Application

A thorough coating of GF 250 is to be troweled over the entire surface. Great care must be taken that the coating is thoroughly troweled in around all window frames to insure a tight joint around lintels and sills. The coating thus applied should be not less than 1-16" thick at any point.

WATERPROOFING THE BACKS OF PARAPET WALLS

General—Paragraphs 37 to 39

are to be carefully followed, and

41—Application

A thorough coating of GF 250 is to be troweled over the back of parapet walls, great care being taken to see that the joint between cap flashing and the first course of brick above is very carefully filled. Where there is a concrete parapet, this Mastic Cement should be brought down well under the copper flashing so as to thoroughly fill this joint.

This coating should be carried up through and under the coping, whether it be of tile, limestone or concrete.

SETTING CAP FLASHING

General—Paragraphs 37 to 39

to be carefully followed, and

42—Application

Before the cap flashing is set into the brickwork, a coating of GF 250 shall be troweled over the entire surface of the brick. After the cap flashing is set, another covering coat shall be troweled over the top of the flashing so as to give a thoroughly filled joint before the cement mortar is applied for setting the upper course of brick.

CAULKING AROUND WINDOW FRAMES

43—Application

Remove weather strips, caulk joint between window frames and masonry with oakum or mineral wool tightly packed in with a hammer and caulking chisel to within $\frac{3}{4}$ " of the face. Then cover with GF 250 pressed on with the point of a trowel and replace weather strips.

WATERPROOFING FLAT OR PITCHED CONCRETE OR WOOD ROOFS

General—Paragraphs 37 to 39 are to be carefully followed, and

44—Application

A thorough coating of GF 250 is to be troweled over the entire surface of the roof not less than 1-16" thick. This GF 250 is to be extended up all bulkhead and chimney walls to a height of 8" and up the parapet walls to the height of the copings.

When the roof construction is of wood the roof is first covered with a layer of GF 18 Felt with a lap of 1" at edges nailed with roofing tins and nails 12" apart along edges and 24" apart in center of each sheet, after which apply a coating of GF 250 Primer before troweling on the GF 250.

45—Gravel or Slag

Either regular roofing slag or small roofing gravel may be rolled into the surface of this coating for protection and texture effect. Not less than 200 pounds of slag or 250 pounds of gravel per 100 square feet are to be used. The gravel or slag, must be perfectly dry, if necessary, heat it to obtain this result.

REPAIRING LEAKS IN OLD ROOFS

46—Application

Sweep off surface free of dust, dirt, etc., cover any roof holes or cracks with a piece of tin or tarpaper and cover with a coating of GF 250 troweled on. Cracks and holes in gutters, flashings, around skylights, etc., to be filled with GF 250.

GF Built-up Roofings

In cases where a built-up membrane roof covering is desired, GF Mop Coating (GF 17) is used in conjunction with either GF Saturated Wool Felt (GF 18) or GF Saturated Fabric (GF 21).

SPECIFICATIONS

47—Applying GF 17 Coating and GF 18 Saturated Wool Felt

All roof surfaces shall be dry and swept clean and all joints and cracks pointed up. Before GF No. 17 is applied to any concrete or masonry surface a priming coat of GF No. 16 shall be used.

The roofing shall consist of 3 plies of GF No. 18 Bitumen Saturated Wool Felt and GF No. 17 Bitumen Coating.

The GF No. 18 shall be laid singly with one third of the width of each ply exposed and each ply shall be stuck to the under surface and coated on top with GF No. 17 applied hot.

All connections to flashings, etc., shall be made with laps of at least 6" which shall be cleaned and dried.

If laid upon a wood foundation the under coat of GF No. 17 shall be omitted. Each ply shall be nailed with roofing tins and nails spaced 6" apart along the edge and about 2 feet apart in the center, care being taken that these nails and tins are well covered with the hot GF No. 17 Coating.

48—Applying GF 17 Coating and GF 21 Bitumen Saturated Fabric

All roof surfaces shall be swept clean and dry and all joints and cracks pointed up. Before GF 17 is applied to any concrete or masonry surface, a priming coat of GF 16 is to be used.

The roofing shall consist of 2 plies of GF 21 Bitumen Saturated Fabric and GF 17 Bitumen Coating applied hot.

The GF 21 Fabric shall be laid with the second layer overlapping the first for a width of 19" and each ply shall be stuck to the under surface and coated on top with GF 17 Bitumen Coating applied hot.

At all parapet walls, bulkheads, chimneys, etc., form flashings of the same material, carried up to a height of 8" above the roof level.

All connections shall be made with laps of at least 6" which shall be carefully cleaned and dried before attaching the new work.

If laid upon a wood foundation, only the surface of the first layer between laps and the upper surfaces of the GF 21 shall be coated with GF 17. Each layer shall be nailed with roofing tins and nails spaced 6" apart along the edges and about 2' apart in the center of each layer, care to be taken that these nails and tins are well covered by the hot GF 17 coating.

Expansion joints in Floors, Walls, Viaducts, Roadways, Sidewalks, and Vault Lights

Expansion joints of any kind naturally require filling with a material that will be waterproof and remain plastic under any changes in temperature without being sticky on the exposed edge.

Such a material is GF 250 Elastic Cement made in black, gray, buff, red and brown.

The covering capacity is 4 sq. ft. of surface $\frac{1}{2}$ -inch thick per gallon of GF 250 Primer.

The covering capacity is 50 sq. ft. of surface per gallon of GF 250.

1 man can apply 4 gallons GF 250 Primer and 20 gallons of GF 250 per day

1-gal. cans.

5-gal. cans.

30-gal. half drums.

50-gal. drums.

Shipping weights GF 250 Primer, 9½ lb. per gallon.

Shipping weights GF 250, 15 lb. per gallon.

49—Specification for filling expansion joints with GF Elastic Cement

All expansion joints (designate where) are to be smooth and clean. Apply a brush coating of GF No. 250 Primer, and then a coating of GF No. 250 elastic cement troweled on smoothly to a thickness of $\frac{3}{4}$ ". The GF No. 250 to be of color designated by the Architect.

Where expansion joints have been previously formed and left for filling later, they are to be scraped and brushed out clean, apply a brush coating of GF No. 250 primer and then fill the joint, with GF No. 250 elastic cement of color to be selected. To be solidly pressed into the joint by means of a small pointing trowel and the top edge smoothed off and dusted over with a sprinkling of dry cement.

GF Cement Accelerator (GF 12)

The Contractor's Friend

IT is rather misleading that a material having so many good qualities as *GF Cement Accelerator* (GF 12) should be named by one of these qualities to the exclusion of others equally valuable. Logically the name of this remarkable product should be GF Cement Accelerator, Concrete Hardener, Frost Preventive, Waterproofer, Time and Money Saver (GF 12). Each one of these qualities is alone the reason for the use of this material in many cases, and all of them combined are so attractive that it is becoming customary for contractors to standardize on its use, regardless of whether it is specified or not. This practice is perfectly justifiable as *GF Cement Accelerator* (GF 12) is unique in one very important respect—its use saves the contractor more money than it costs.

GF 12 is applicable to any part of a building for any kind of cement construction whether concrete, brick or stucco. It necessitates no extra labor cost and saves its own cost many times over in increased volume of work in all temperatures, winter or summer, whether used in the actual construction itself or in stucco or floor finish.

GF 12 is a colorless liquid. Its application is simplicity itself—it is merely added to the gauging water used in mixing the aggregates.

GF 12 will not corrode reinforcing bars.

Shipped in

1 gal. cans.	30 gal. half drums.
5 gal. cans.	50 gal. drums.

Shipping weight

10 lbs. per gallon.

As a Frost Preventive

Pouring concrete, laying brick or putting on stucco in freezing weather is risky, the ordinary precautions being expensive and uncertain. Hot aggregates or water may cool too rapidly, while protection afforded by tarpaulins and salamanders is both unequal and uncertain, irrespective of the expense entailed by the necessity for their long continued use.

But GF 12 when used as a frost preventive is always reliable. The exact amount of frost protection put into the mixture will always be there. The rules are very simple: *To protect against three degrees of frost, use one gallon of GF 12 to each ten gallons of gauging water; for eight degrees of frost use two to ten mixture, and for fifteen degrees use three to ten.*

There are three reasons for the action of GF 12 as a frost preventive. In the first place, the accelerated chemical action increases the temperature of the mass. A mixture of materials at 32° F. may thus easily rise to a temperature of 38° F. In the second place, the freezing point of water treated with GF 12 is lower than 32° F. It can, in the case of a strong solution, be brought as low as 17° F. Finally, the acceleration of the setting up action decreases greatly the period during which freezing of the concrete, mortar or stucco

would be dangerous. In other words the work sets before the frost has time to get into action, and once in the mix GF 12 becomes automatic in its action.

As an Accelerator and Hardener

In reinforced concrete construction a monolithic bond between the floor finish and the concrete is essential. As every practical construction man knows it is several months before ordinary concrete attains its final hardness, and using a cement floor before it is hard enough to stand the traffic invariably results in injury. Consequently the floor topping is either put on at time of pouring the concrete, necessitating considerable overtime work and expensive precautions for protecting the finish afterwards or else the top finish is put on after the construction work is finished. In the latter case the concrete surface becomes dirty, worn and pitted, special precautions must be taken in an attempt to secure a monolithic bond for the finish to the concrete, and, in addition, it usually takes 1¼" to 1½" of finish over all, instead of 1", to finish up to the established floor levels. Either method is expensive and more or less uncertain.

A floor in which GF 12 is used will not develop trouble. It attains a month's age in three days and, being thus protected against the effects of use, the topping can be put on at time of pouring without excessive overtime, as the top finish will set so that it can be troweled and finished two hours after laying. A monolithic bond is thus assured and construction can proceed uninterruptedly without the necessity of special protection to the finished floor surface.

As a Cement Wash

An excellent cement grout for washing over concrete surfaces is made by mixing white Portland cement with a one to ten mixture of GF 12 and water. The wash should have the consistency of paint. The GF 12 causes the gauging water to enter into immediate combination with the cement, rather than to evaporate, and the wash adheres firmly to the surface without dusting or brushing off.

As a Waterproofing Compound

GF 12 has a great lubricating effect on the particles of the wet aggregates. As the finishers say, it makes the mixture work "fatty." This causes the particles to settle closer into place, more readily drawing excess water to the surface. A dense concrete is always a waterproof concrete. GF 12 by thus increasing the density of the mixture, at the same time increases its hardness and makes it waterproof.

Other Uses for GF Cement Accelerator (GF 12)

Cement stucco put on in early spring or late fall when frosts occur at night is liable to become injured. GF 12 will obviate this by causing the stucco to set up by the time its exposure to frost occurs.

The mortar used in laying up brick in winter weather should always be treated with it. In these cases the mortar is spread so thin that it is impossible to prevent freezing by using heated aggregates as they cannot be prevented from cooling quickly. Of course, when GF 12 is used as an anti-freeze mixture with cement mortar, it still retains its property of acceleration. The size of the batches should be fixed with this condition in mind.

GF 12 should be used for all cement floor and sidewalk work—all of the advantages previously discussed making it particularly economical for such work.

SPECIFICATIONS

For GF Cement Accelerator (GF 12) as an Accelerator, Hardener and Waterproof

The materials, mixture, method of mixing, pouring, and troweling used will follow standard practice.

The gauging water used in wetting up the dry mixture will be treated with one gallon of GF 12 to each ten gallons of water.

As a Frost Preventive

The proper amount of GF 12 to use must be left to the discretion of the building superintendent who must anticipate the lowest temperature to be expected for two hours after the work is placed and plan accordingly.

In case it is necessary to place concrete (or topping, or brickwork, or stucco, as the case may be) in freezing weather, protect the work from frost by using GF 12 in the gauging water in the following proportions:

Expected Temperature	Mixture
29°	1-10
24°	2-10
17°	3-10



Davis & Lawrence Company, New York City. Architect W. L. Stoddart, New York City. Contractor, Hegeman-Harris Co., New York City. GF No. 12 Accelerator used in concrete floors, supplied by Fireproof Products Co., Inc., New York City.

SECTION III—The Waterproofing Handbook

CEMENT AND WOOD FLOOR PRESERVATION

Methods and Materials for Hardening, Dustproofing, Decorating and Waterproofing Cement and Wood Floors; for Accelerating the Setting and Preventing the Freezing of Newly Laid Cement Floors. With Specifications for the use of the Waterproofing Agents, GF 12, GF 140, GF 145, GF 155 and GF 160.

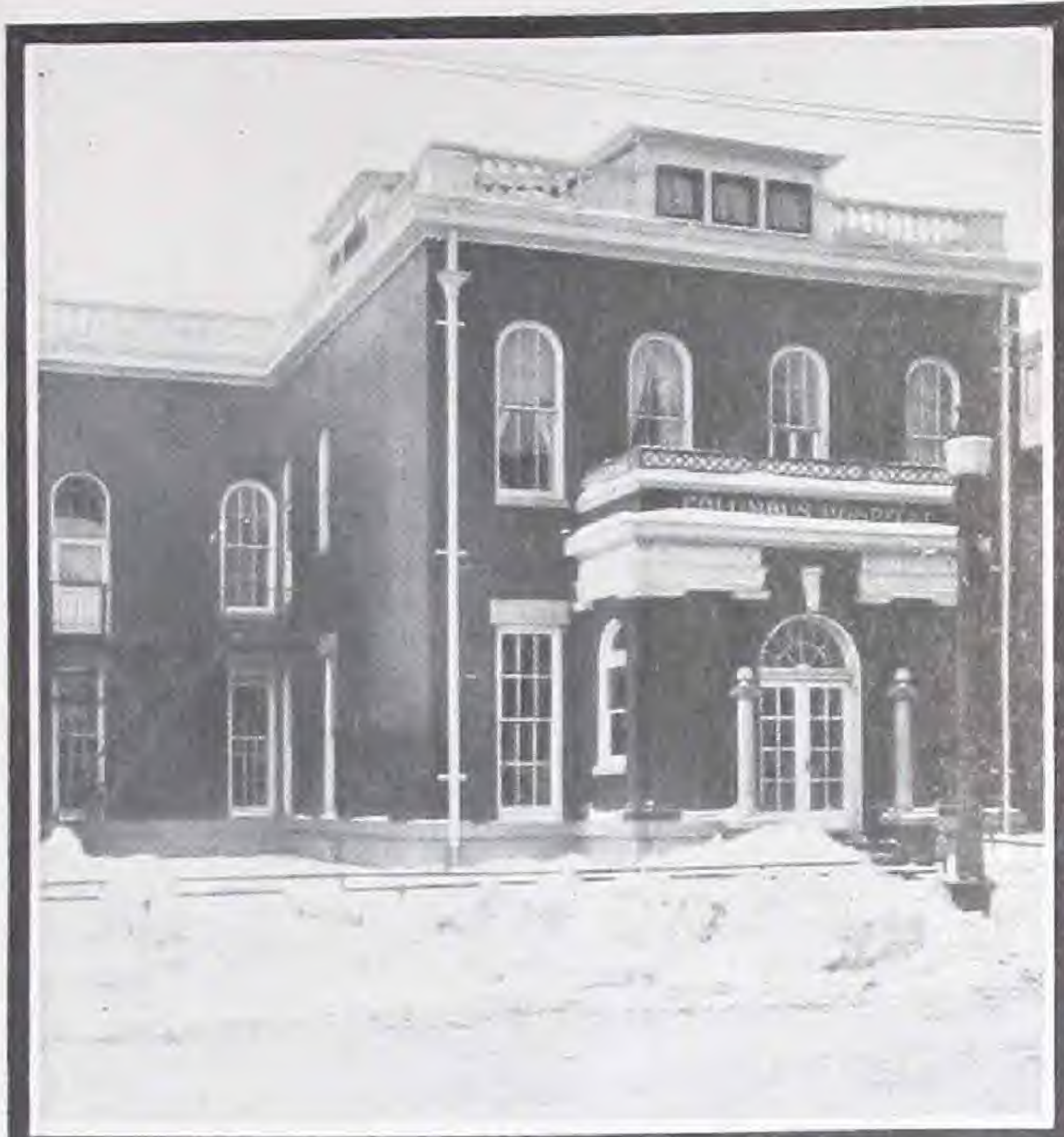


The General Fireproofing Company
Youngstown, Ohio

SYRACUSE CHICAGO BOSTON MILWAUKEE KANSAS CITY MINNEAPOLIS ST. LOUIS OMAHA
SAN FRANCISCO ATLANTA PHILADELPHIA NEW YORK CLEVELAND LOS ANGELES

Export Department, 438 Broadway, New York City. Cable Address—"Genfire New York."

Printed in U. S. A. A 326-8



Columbus Hospital, Buffalo, N. Y. GF Crystalrox used for hardening floors. Contractors, Lith & Sons, Buffalo.



Anglo & London, Paris National Bank, San Francisco, Calif. GF Crystalrox used as floor hardener. Architect, Geo. W. Kelham. Contractors, R. McLevan Co.



Hotel Statler, Buffalo, N. Y. GF 10 and GF 12 used. Architect, Geo. B. Post & Son, New York City. Contractor, Masten Construction Co., N. Y. City.



Hutchinson Bldg., Oakland, Calif. GF 145 for floors.



Franklin School, Sacramento, Calif. GF Crystalrox (GF 145) used for hardening floors. Architects, Hennings & Peterson, Sacramento.

Specification Guide

Cement and Wood Floor Preservation

CONDITION	METHOD	PRODUCT	PAGE
Oilproofing and Hardening Cement Floors	Incorporate Metallic Hardener	GF 140	52
Hardening Old or New Cement Floors	Apply Colorless Chemical Hardener	GF 145	54
Integrally Hardening, Waterproofing Accelerating Set and Frost Prevention of Cement Floors	Incorporate Integral Hardener	GF 12	60
Painting Cement Floors	Apply Tinted Hardener	GF 155	57
Protecting Cork or Linoleum laid on Cement	Apply Colorless Chemical Hardener	GF 145	54
Preserving Cork and Linoleum Floors	Apply Preservative Coating	GF 160	58
Preserving Mozaic and Terrazzo Floors	Apply Colorless Chemical Hardener	GF 145	56
Preserving Wood Floors	Apply Preservative Coating	GF 160	58
Preserving Dance, Skating and Gymnasium Floors	Apply Preservative Coating	GF 160	58
Preserving Painted Signs	Apply Colorless Chemical Hardener	GF 145	56
Weatherproofing Limestone	Apply Colorless Chemical Hardener	GF 145	56
Painting Newly Plastered Walls	Apply Colorless Chemical Hardener	GF 145	56

Hardening and Oilproofing Cement Floors by Treating During Construction

CEMENT floors or walks, no matter how carefully laid, will almost invariably dust up heavily when subjected to wear, or deteriorate under the action of oil and grease, unless some special precaution is taken. This not only results in rapid deterioration of the floor or sidewalk, but causes a great deal of damage from the dust which rises into the atmosphere.

Such dust works its way into the most carefully guarded bearings of machinery, causing great damage, and has been found to be particularly harmful to textiles of all kinds.

GF Metallic Floor Hardener (GF 140)

The most permanent method of preventing these conditions, and the most economical, is to incorporate a hardening element into the surface of the finished floor, using GF Metallic Hardener (GF 140).

The use of GF 140 in no way alters the method of laying the floor, for it is simply sifted on evenly after the cement top finish has been laid. The result is a firm, wear-resisting, dustproof and oilproof surface.

GF 140 is a finely ground iron of definite grading rendered not easily water absorbent by the addition of a material for waterproofing the surface of each particle to prevent initial corrosion or oxidation which may occur in transit or storage, from dampness in the air or on the ground. Finely ground iron particles in contact with moisture oxidize rapidly, thereby increasing four times in volume. When the mixture of GF 140 and cement is placed upon the wet surface the cement in the mixture bonds to the wet cement below. The action of troweling grinds the particles of GF 140 into the cement and water, the temporary waterproof coating is destroyed, the iron particles oxidize and expanding, are bonded perfectly together by the intervening cement so that the whole coating becomes monolithic with the surface to which applied.

It is obvious, that if not so temporarily waterproofed, the particles of iron would very likely become oxidized before being used. The result being that the value of their expansive and consequent bonding action would be lost before they could be applied to the surface to be hardened.

Covering capacity, 15 lbs. GF 140 per 100 square feet of surface for ordinary conditions of wear. Under exceptional conditions 20 to 30 lbs. per 100 square feet of surface.

Made in either black or red.

Shipped in 100-lb. bags.

SPECIFICATIONS

For Applying GF Metallic Hardener (GF 140)

1—Material

GF Metallic Hardener (GF 140) as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from them or their authorized agents. The Hardener must be delivered at the building site in original packages, and must be used in strict accordance with the manufacturer's directions.

2—Cement

All cement to be a high grade Portland Cement, meeting satisfactorily the requirements of the standard specifications of the American Society for Testing Materials, and shall preferably be so ground that 80 per cent will pass a standard 200 mesh sieve.

3—Sand

All sand shall be absolutely free from loam, clay, vegetable or other deleterious organic matter, and uniformly graded from coarse to fine in size.

4—Grit

If it is desirable to use grit, this material is to be crushed traprock, granite or white quartz grit of a size that will pass a 3-16" screen.

5—Mixing

Mix the cement, sand and grit thoroughly together in the manner usually employed when laying an ordinary cement floor, turning it over at least three times dry. Then add sufficient water to temper the mass to the desired consistency.

6—Method of Using

Mix one bag of GF Metallic Hardener (GF 140) and one bag of Portland Cement thoroughly together dry.

This mixture of cement and GF 140 shall then be thoroughly and evenly sifted over the surface to be hardened just prior to the final troweling using 30 lbs. of the mixture for every 100 square feet of surface for ordinary conditions and 40 to 60 lbs. for exceptional conditions.

7—Finishing

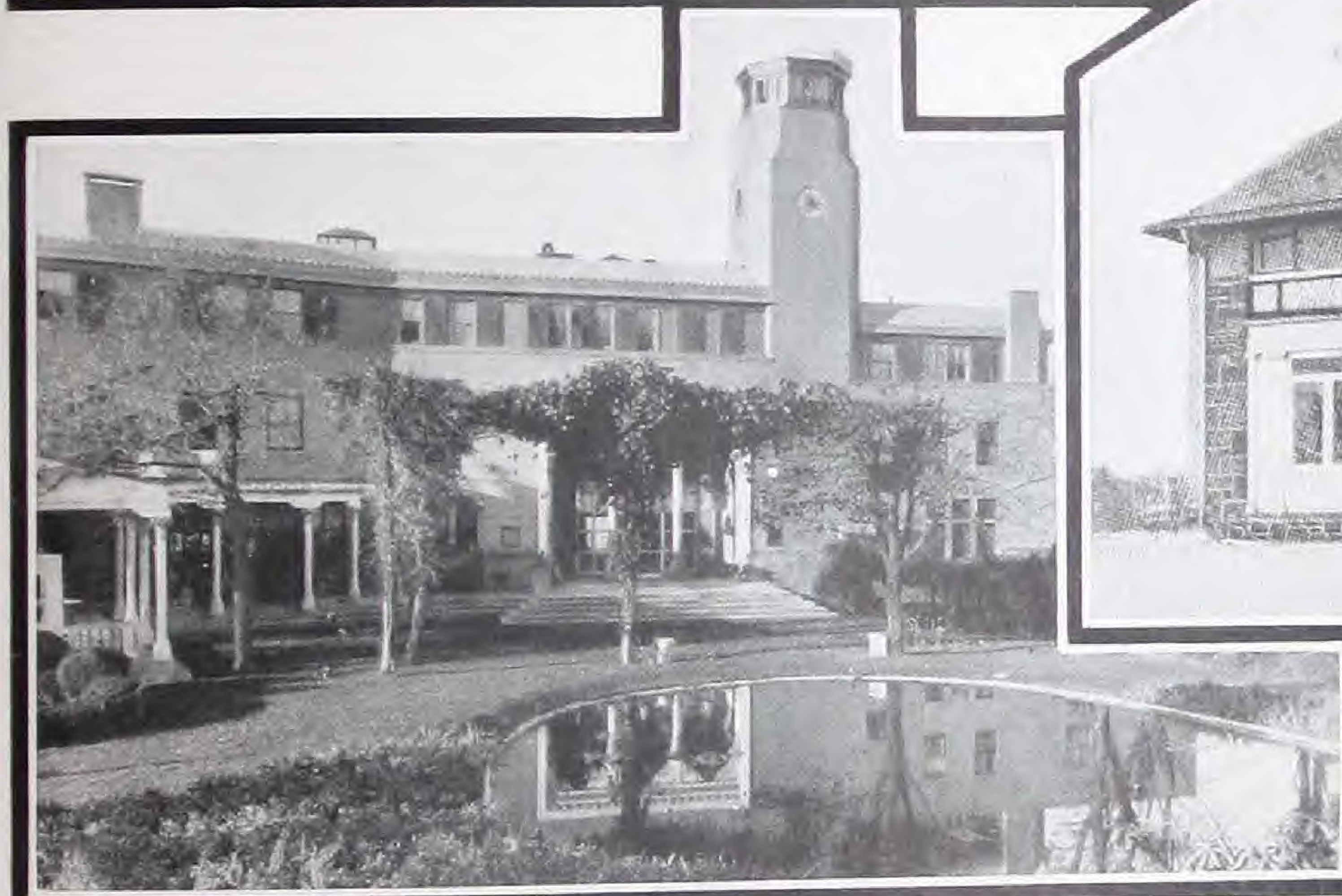
When the floor is ready for finishing, work the surface thoroughly with a wooden float. Tamp down well with the float and then finish in the usual manner with a steel trowel.

8—Curing

Twenty-four hours after the floor is finished, it shall be wet down and kept wet for a period of six days, either by flushing with water two or three times a day, or the surface may be covered by a layer of sawdust, paper or sand and kept wet.



Darlington High School, Darlington, S. C. GF Floor Enamel (GF 155) used.



Residence of Louis C. Tiffany, Oyster Bay, L. I. Cement floors coated with GF Floor Enamel (GF 155).



Residence of A. B. Siewert, Duluth, Minn. Architects, German & Jensen, Duluth. GF Floor Enamel (GF 155) used on basement floors.



St. Elizabeth's Hospital Youngstown, Ohio. GF Floor Enamel (GF 155) used. Architect, Charles Owsley. Contractor, Heller Bros.

Hardening Cement Floors by an After-Construction Treatment

A THOROUGHLY dependable material for hardening and dustproofing old or new cement floors does more than cover the surface—it combines chemically with the cement, making the top surface of floor hard, impervious and wear-resistant.

GF Crystalrox (GF 145)

Such is the action of GF Crystalrox (GF 145) a chemical floor hardener applied as a liquid to new or old cement floors.

By test, GF 145 increases the wear resistance of cement floors 30 to 50 per cent and renders them proof against oils, alkalies, dilute acids and water. All this is accomplished without changing the appearance of the floor—the surface is transformed into a crystal-hard, fine-textured floor.

By using GF 145 the voids in the surface are filled with hard, insoluble compounds. This completes the bond between the sand and cement and gives a dense, extremely hard-wearing surface.

While even this surface will wear under severe and long continued traffic, it is a simple matter to again apply GF 145 after a few years, and bring the floor back to the same good condition as when first hardened.

GF Crystalrox (GF 145) is in the form of crystals and is dissolved in water on the job. We have adopted this method for greater security and convenience in handling and storing, as in crystal form the material will keep indefinitely, without danger from frost, occupies less storage space and saves cost of barrels and freight on water used in all solution forms.

Preparation of GF 145 and Covering Capacities

GF 145 is applied in two coats made up as follows:

First Coat	Second Coat
2 lbs. GF 145 to 1½ gallons of Clear Water	2 lbs. GF 145 to 1 gallon of Clear Water
Covers 200 sq. ft. per lb. of Crystals	Covers 150 sq. ft. per lb. of Crystals.

This forms a 17% solution over all.

Shipped in

1 lb. cartons
14 lb. cartons

Labor cost

One man can apply 28 pounds GF 145 per day.

SPECIFICATIONS

For Applying GF Crystalrox (GF 145)

GENERAL

9—Material

GF Crystalrox (GF 145) is to be purchased direct from the manufacturers, The General Fireproofing Company, Youngstown, Ohio, or their authorized agents. It is to be brought to the building site in original packages and applied in accordance with the manufacturer's directions.

The GF 145 is dissolved in water for use as hereinafter specified.

10—Preparation of Surface

New Floors—The floor must be completely set up and the treatment of GF 145 should not be made under three weeks after finishing floor. Loose sand, dust, or other foreign matter must be brushed off to permit of greatest penetration.

Old Floors—Remove all dirt, oil, grease, paint, etc.

11—Preparation of Material

GF 145 shall be dissolved in clear water and applied in two coats as follows:

First Coat—Two pounds of GF 145 to 1½ gallons of water.

Second Coat—Two pounds of GF 145 to 1 gallon of water.

12—Application

GF 145 may be applied with a brush or mop. The mop is the best to use, as it spreads the material more evenly, and with less labor for the workman.

Wash down well with water to obtain the proper penetration, and when surface is dry (in about 10 minutes) the first coat of GF 145 shall be applied, followed about 12 hours later by the second coat.

13—Caution

Solutions of GF 145 should be kept in earthenware or fibre pails. GF 145 has a strong corrosive tendency in direct contact with metal.

Don't let the material touch the eyes or open cuts.

To prevent evaporation, have the container tightly covered when not in use.

UNDER LINOLEUM, CORK, CARPETS, ETC.

Paragraphs 9 to 13 are to be followed, and

14—Application

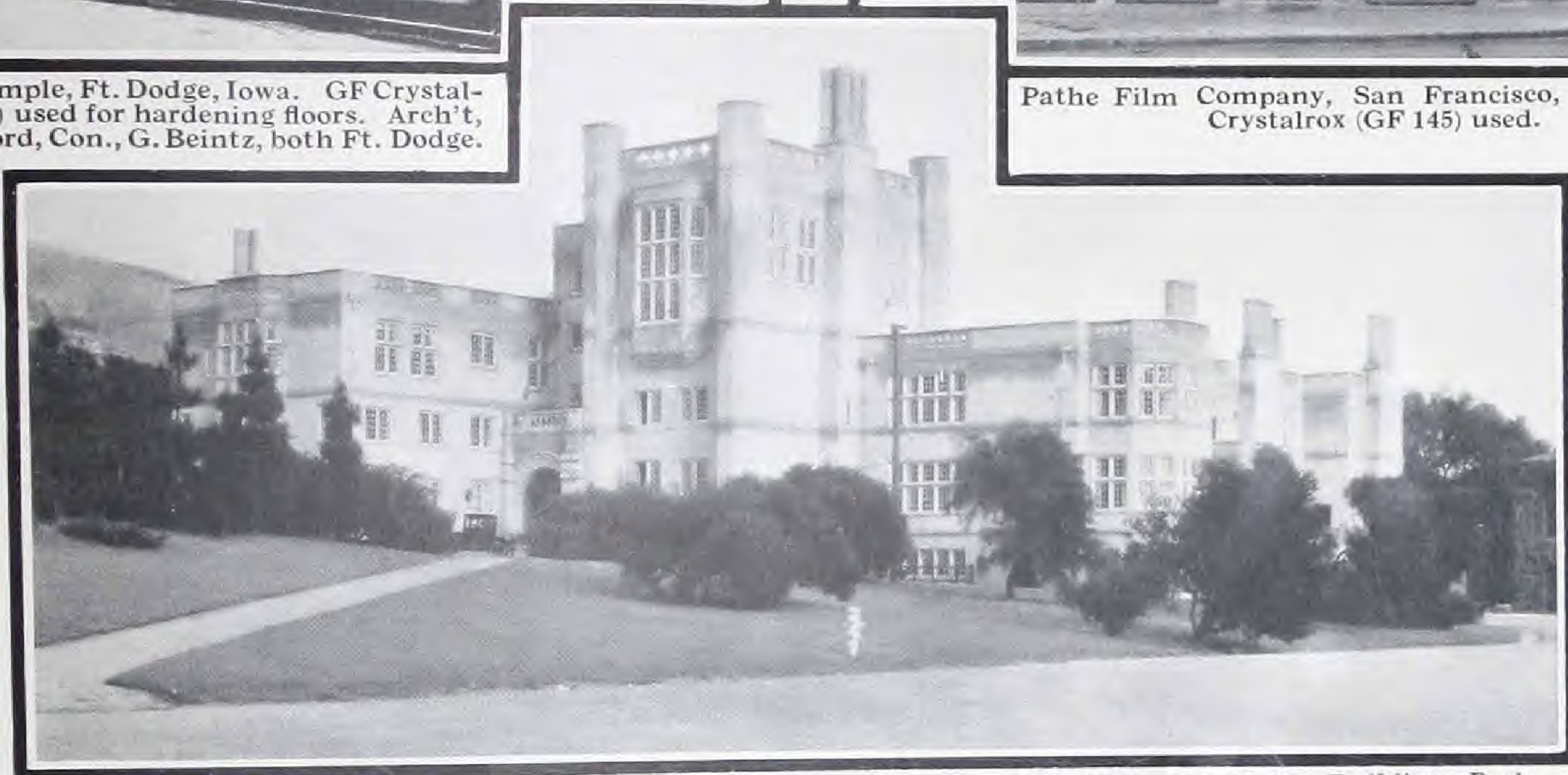
Cement floors intended to be covered with linoleum or cork, or other carpets shall receive 2 coats of GF 145, as before specified, to prevent dampness, condensation and subsequent damage to the covering.



Masonic Temple, Ft. Dodge, Iowa. GF Crystalrox (GF 145) used for hardening floors. Arch't, J. H. Bradford, Con., G. Beintz, both Ft. Dodge.



Pathe Film Company, San Francisco, Calif. GF Crystalrox (GF 145) used.



Students' Union Building, Berkeley, Calif. GF Crystalrox (GF 145) used.

Pilgrim Congregational Church, Duluth, Minn. (GF 145) on face of limestone. Architects, German & Jensen, Duluth.



Morley School, Detroit, Michigan. GF Crystalrox (GF 145) used as floor hardener. Architects, Malcomson & Higginbotham. Contractor, A. J. Smith Construction Co.



The American Bank, Oakland, Calif. GF Integral Waterproofing Powder (GF 11) used. Architect, E. T. Foulkes, Oakland, Calif.

MOSAIC AND TERRAZZO FLOORS

The cement in mosaic and terrazzo floors soon disintegrates through the grinding in of dirt and dust and the chemical action of the strong soaps and alkalies used in cleaning the floors, so that the cement disappears, leaving the pieces of marble protruding, and they ultimately break out, leaving a pitted appearance.

Application of GF 145 will prevent such rotting away of the surface and also, to a considerable extent, prevent cracking of such floors. It can be used without changing the finished appearance. This will also prevent staining and discoloration of the marble.

15—Application

All mosaic and terrazzo floors, after rubbing and finishing the surfaces, are to be cleaned of all mortar, paint, dirt, etc., and to receive 2 coats of GF 145 dissolved in water. The first coat to be used in the proportions of 2 lbs. of GF 145 to 1½ gallons of water and the second coat 2 lbs. of GF 145 to 1 gallon of water.

PAINTED SIGNS

16—Application

Treating concrete or brick wall surfaces, intended to receive painted signs with a coat of GF 145 consisting of 2 lbs. of GF 145 to 1 gallon of water will prevent saponification and subsequent cracking and peeling of the paint.

STAINPROOFING LIMESTONE

General—Paragraphs 9 to 13 are to be carefully followed, and

17—Application

The surface of the stone shall be clean of all stains and foreign matter, and perfectly dry before application is commenced. GF 145 shall be applied in 2 coats of the proportions above specified, with a sponge, care being taken to get a thorough saturation.

Any excess material that is not absorbed at the end of five minutes shall be wiped off, as this material has not come in contact with the lime, and will be of no use as a protection to the stone.

NEW PLASTERED WALLS

18—Application

Where it is desired to decorate new plastered walls immediately, a treatment of 2 lbs. of GF 145 and 1 gallon of water shall be liberally brushed on and allowed to dry thoroughly—this has the effect of neutralizing the causticity of the surface, thereby permitting of a paint coating immediately after the drying out of the treated surface, and is a sure preventive of saponification when linseed oil paint is used.



J. W. Jenkins Sons Music Company Warehouse, Kansas City, Mo.
GF Crystalrox (GF 145) used on floors.

Protecting Cement Floors by Means of a Decorative Enamel Coating

CEMENT floors for hospitals, schools, hotels, sanitariums, apartment houses, etc., while advisable from a fireproofing standpoint are sometimes objectionable because they become stained and unsightly or may not harmonize with the decorative effects of the building.

The preparation of a suitable decorative coating for a cement floor is a matter of considerable difficulty.

As is well known to all architects and engineers, a linseed oil paint loses its value when applied to cement. The cement contains a considerable quantity of free lime which combines with the oil of the paint to form a soap. This soap is soluble, thus permitting the pigments in the paint to be washed out with the frequent cleaning of the floor. It loses entirely the adhesive qualities which make dried linseed oil so desirable as a vehicle for the pigment in paint for wood surfaces. For these reasons, the application of an ordinary linseed oil paint to a cement floor is sure to be a disappointment.

GF Floor Enamel (GF 155)

To meet these objections, GF Floor Enamel (GF 155) has been developed. The vehicle is a perfectly compounded product of oils so made that it will hold pigment well in suspension, and is immune from attack by alkalies or weak solutions of acids. The lime in cement has no effect whatever upon it. The pigments are ground with exceeding fineness, and are so combined with the vehicle that when applied to cement the pigment itself, together with the vehicle, penetrates the pores to a depth sufficient to obtain a good bond.

GF Floor Enamel is used for concrete floors in offices, stores, schools, power stations, garages, machine shops, in fact, wherever there is a tendency for floors to dust and where the presence of dust would be injurious. Concrete dust penetrates the most closely covered machinery bearings, gets into merchandise and stocks, and floats in the air in offices and school rooms, endangering health.

GF 155 can be applied to any cement floor with beneficial results, giving a pleasing decorative effect and preventing dusting. It is made in warm decorative tints, is easily cleansed with soap and water, fills perfectly the pores in the cement floor, and makes it perfectly non-absorbent.

Furnished in Colorless, Gray, Green, Red and Brown.

Covering capacity

200 sq. ft. per gallon, 2 coats.

Shipped in

- 1 gal. cans.
- 5 gal. cans.
- 30 gal. half drums.
- 50 gal. drums.

Shipping weight

9 lbs. per gallon.

Labor cost

One man can apply 12 gallons per day.

SPECIFICATIONS

For Applying GF Floor Enamel (GF 155)

GENERAL

19—Material

GF Floor Enamel (GF 155), as manufactured by The General Fireproofing Company, Youngstown, Ohio, shall be purchased direct from them or their authorized agents, and brought to the building site in original sealed packages and shall in no wise be adulterated or thinned except as hereinafter specified.

20—Preparation of GF 155 for Application

First—The top of the packages shall be cut out to allow for the most thorough stirring and mixing.

Second—No thinner shall be used except in the case of a very dense surface over which material is to be applied, in which case a very small amount of pure turpentine may be used. It is, of course, necessary to get the best penetration possible.

21—Preparation of Floors

First—The floor shall be entirely cleaned of dirt, oils, greases or loose particles of cement.

Second—The floor shall be perfectly dry.

Third—If previously coated with any other coating than GF Floor Enamel (GF 155), said coating shall be removed insofar as possible with varnish remover. If necessary, use wire brushes to clean the floor of scale, mortar or paint.

22—Application

In case of floor laid directly on the ground as in case of basement floors, apply a liberal coat of GF 155 Primer. The Primer shall be allowed 24 hours to dry before applying GF 155.

GF 155 shall be applied with an ordinary paint brush and brushed thoroughly into the pores of the surface to permit a perfect bond to the floor.

A second coat of GF 155 shall be applied 48 hours after the first coat is finished.

Protecting Inside or Outside Wood Floors by Means of a Resinous Brush Coating

THE life of an inside or outside wood floor can be greatly lengthened by treating its surface with a material that thoroughly impregnates the wood pores with a resinous compound similar to the natural resin that gives yellow pine its distinctive color and makes it so much harder and wear-resistant than white pine.

GF Wood Floor Preservative (GF 160)

GF Wood Floor Preservative (GF 160) is just such a material. It is a combination of resinous gums dissolved in oil which has been so treated as to give it great penetrative powers.

When applied to a wood floor GF 160 penetrates deeply into the pores of the wood, depositing its resinous gums around the fibres and binding them thoroughly together. It does not dry, in the ordinary sense of the word, that is, no part of it evaporates, but it hardens by combining with oxygen of the air. Nothing is lost when it hardens. On the other hand, oxygen is added and the final weight of the cementing gums deposited within the pores is greater than the total weight of the applied material. It is, therefore, much more efficient and economical than any preparation having an alcohol, turpentine or linseed oil base.

The appearance of a floor which has been treated with GF Wood Floor Preservative (GF 160) is similar to that of a varnished floor but without the gloss of varnish. Further finish is generally regarded as unnecessary. The color of a floor which has been treated with GF Wood Floor Preservative (GF 160) remains uniform far longer than that of one which has been coated with varnish or oil, because the treatment is within the wood, preserving and strengthening the fibres, rather than on the surface, exposed to wear.

Any open fibred wood which can be preserved and improved by a resinous treatment, is helped by an application of GF 160. For example, the roof trusses of Independence Hall in Philadelphia were found recently to be in danger from dry rot, and were given a treatment of this preservative. The timbers of mill construction buildings particularly in damp situations are often so treated.

Covering capacity

400 to 500 sq. ft. per gallon.

Shipped in

1-gallon cans

5-gallon cans

30-gallon half-drums

50-gallon drums.

Labor cost

One man can apply 15 gallons per day.

Directions for Application

The application of GF Wood Floor Preservative (GF 160) is simplicity itself. First, be sure that the floor is clean so that no dirt will be carried into the pores, and that it is dry so that the preservative will penetrate, then swab the GF 160 liberally over the floor, using a long handled brush. It will cover about four hundred square feet to the gallon. If the wood structure is soft, a second application twenty-four hours later may be desirable. Twenty-four hours after the final (or only) application, the floor is ready for use.

GF 160 will be a positive benefit to any floor, whether of pine, oak, maple or any other wood. One application is sufficient for hard wood but for pine more than one is generally advisable. It forms an excellent base for paint, varnish, polish or wax, if a high gloss finish is desired, hardening and preserving the floor in a way that cannot be done by any mere surface treatment, but the best results cannot be obtained unless it is applied directly to the wood itself.

Linoleum and Cork-Tile Floors

The wearing qualities and appearance of linoleum and cork-tile carpets and floors will be considerably increased and improved by a treatment of GF 160 Wood Floor Preservative, as it will assist in retaining the freshness of the colors, prevent the grinding in of dust and dirt, and also preserve the surface and constituents of the composition from the destructive effects of oil, grease, water, alkalies, etc.

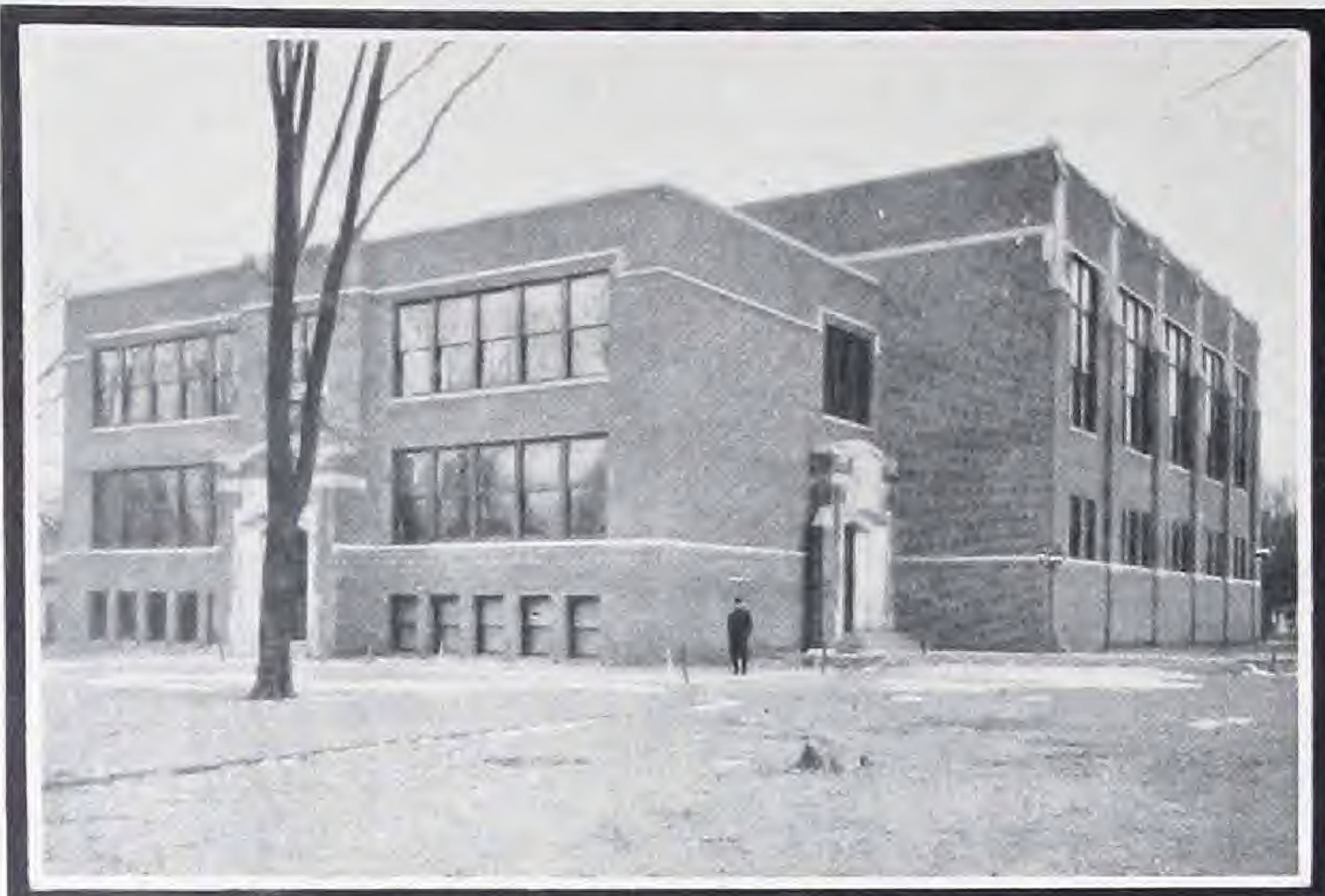
Skating Rinks, Dance and Gymnasium Floors

The floors of skating rinks and gymnasiums are rendered wearproof and dustless by the application of one coat of GF 160.

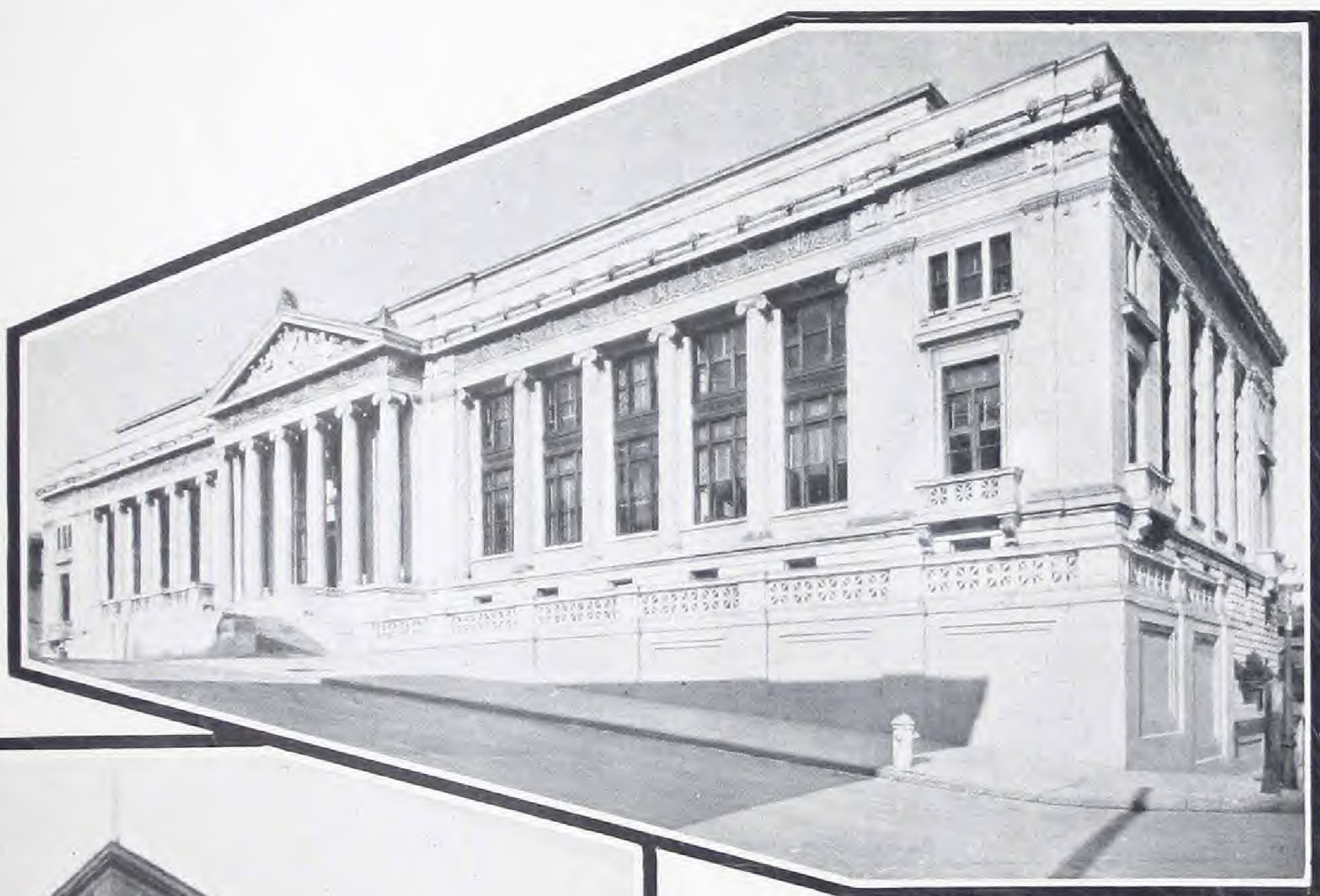
On dance floors a prior application of GF 160 will fill the pores and give a hard, resilient surface for the application of the wax coating.



Levy Factory, New Rochelle, N. Y. GF Cement Accelerator (GF 12) used.



Public School, Tecumseh, Mich. GF Foundation Brush Coating (GF 16) and GF Crystalrox (GF 145) used. Architect, M. M. Stophlett. Contractor, V. M. Gettins.



Metropolitan Life Insurance Building, San Francisco Calif. GF Crystalrox (GF 145) used as floor hardener.



Frontana Manufacturing Company, San Francisco, Calif. GF Crystalrox (GF 145) used as floor hardener.



Fresno Consumers' Ice Company, Fresno, Calif. GF Crystalrox (GF 145) used as floor hardener.

Accelerating the Setting of, Hardening, Waterproofing, and Preventing the Freezing of Newly Laid Concrete or Cement

WHEN topping a concrete floor, speeding up the chemical action increases tremendously the ease of working. Ordinarily a cement floor which is poured at eight a. m. is not ready for final troweling before one or two o'clock in the afternoon. When troweling is started it must proceed continuously until the day's work is topped, otherwise a good bond will not be secured. This means that if the pouring gang put in a day's work, the finishers must work well into the night.

GF Cement Accelerator (GF 12)

GF Cement Accelerator (GF 12) is a chemical compound which, when mixed with the concrete and topping in the proportions we recommend increases the speed of the setting up process—the union of the cement with the water—by about one hundred per cent. It so speeds up the setting of the top that the finishers can work closely behind the pouring and thus get an integral bond without the necessity of long delay while the top is getting in condition to trowel.

Overtime work for the cement finishers is the bane of the contractor's existence. The overtime rate of pay itself is enough to take the profit out of a job were it not that a certain amount of this can be anticipated in making up the bid. But the amount of work a finisher will do at two a. m. cannot be anticipated. The night may be cold and the cement may set slowly. Or the finisher, as human as the rest of us, may be sleepy. Added to this is the difficulty of doing a perfect job with the uncertain artificial light usually provided for construction work. It is no wonder that the results obtained from overtime work are disappointing as well as expensive.

Under identical conditions a cement top treated with GF 12 can be finished more rapidly than one which is untreated. The addition of the GF 12 makes the mortar more fatty and thus the troweling is easier and the finish better. The increased speed with which the cement absorbs water, too, makes the work more rapid as there is less delay in waiting for the top to get into correct troweling condition.

Average experience demonstrates that a finisher who can finish four hundred square feet of untreated work a day will be able to increase his day's work to five hundred square feet if he is permitted to treat his mixture with GF Cement Accelerator (GF 12). In other words, entirely aside from overtime, a gang of four finishers working with GF 12 is equivalent to five finishers handicapped by the lack of that material.

GF 12 as an Anti-Freeze Mixture

Unless suitable precautions are observed, laying concrete and topping in freezing weather is risky business. Even ordinary precautions are uncertain. Hot aggregates, for example, may cool just at the time when freezing of the concrete would be dangerous.

But GF Cement Accelerator (GF 12) when used as a frost preventive is always reliable. The exact amount of frost protection put into the mixture, will always be there. The rules are very simple. To protect against three degrees of frost, use one gallon of GF 12 to each ten gallons of gauging water; for eight degrees of frost use two to ten mixture, and for fifteen degrees use three to ten.

GF Cement Accelerator (GF 12) will not corrode steel and can be used in direct contact with reinforcing bars.

GF 12 as a Floor Hardener

GF 12 hardens a floor so that the surface is as hard in 3 days as an ordinary cement surface in 30 days. This means that in concrete construction the top finish can be made monolithic with the construction without the necessity of taking particular precautions for the protection of the floor during the construction of the successive tiers. For this purpose it requires 1 gallon of GF 12 to every 10 gallons of water used for wetting up the top finish.

Shipped in

- 1 gallon cans.
- 5 gallon cans.
- 30 gallon half-drums.
- 50 gallon drums.

Shipping weight

- 10 lbs. per gallon.

SPECIFICATIONS

For GF Cement Accelerator (GF 12)

AS AN ACCELERATOR, HARDENER AND WATER-PROOFER FOR FLOORS

The materials, mixture, method of mixing, pouring and troweling used shall follow standard practice.

The gauging water used in mixing the topping shall be treated with 1 gallon of GF Cement Accelerator (GF 12) to each 10 gallons of water (one gallon of GF 12 per barrel of cement).

AS A FROST PREVENTIVE

The proper amount of GF Cement Accelerator to use must be left to the discretion of the building superintendent, who must anticipate the lowest temperature to be expected for two hours after work is placed, and plan accordingly.

In case it is necessary to place concrete for topping in freezing weather, protect the work from frost by using GF Cement Accelerator in the gauging water in the following proportions:

Expected Temperature	Mixture
29°	1-10—1 gal. GF 12 per barrel of cement
24°	2-10—2 gals. GF 12 per barrel of cement.
17°	3-10—3 gals. GF 12 per barrel of cement.

SECTION IV—The Waterproofing Handbook

TECHNICAL PAINTS AND COATINGS

Methods and Materials for Rendering Walls, Floors and Containers Proof against Acids and Oils; for Protecting Structural Steel and Galvanized Surfaces from Rust, and Timbers from Dry Rot and Decay; for Bonding New Concrete to Old; for Waterproofing and Hardening Cast Stone and Cement Blocks and Stainproofing Limestone. With Specifications for the use of the Protective Coatings, and Waterproofings, GF 10, GF 11, GF 12, GF 17, GF 99, GF 100, GF 140 (Special), GF 145, GF 160, GF 220, GF 300, GF 325, GF 350, GF 400 and GF 550.



The General Fireproofing Company Youngstown, Ohio

SYRACUSE CHICAGO BOSTON MILWAUKEE KANSAS CITY MINNEAPOLIS ST. LOUIS OMAHA
SAN FRANCISCO ATLANTA PHILADELPHIA NEW YORK CLEVELAND LOS ANGELES

Export Department, 438 Broadway, New York City. Cable Address—"Genfire New York".

Printed in U. S. A.

A 326-9

Specification Guide

Technical Paints and Coatings

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Smoke and Acid-Proofing Cement, Brick, Plaster, Wood or Metal Surfaces

THE complicated industrial processes of the present day almost without exception employ at one stage or another, the use of one or more acids or other chemical agents in the manufacture of their finished product. Some of these chemicals are used merely as agents to produce certain desired results, others are liberated in the form of fumes or gases, while still others enter into or become the finished products themselves.

All of these acids and chemical agents, either in solution or in the form of smoke, gas, or fumes have a more or less disintegrating effect on the materials which enter into the construction of their containers or the factory buildings in which they are used. The destructive tendencies of many of these acids and chemicals are often materially increased by contact with water, moisture or steam.

Conditions of this kind necessitate the application of some form of protective coating to masonry, concrete, wood or steel entering into the construction of either the buildings themselves or of the tanks, containers or vats used for the preparation or storage of the products.

Such a coating must be of a strongly adhesive nature to enable it to stick to the surface to which it is applied; must dry into a firm, hard coating and yet remain sufficiently elastic to take up any expansion or contraction of the surface without cracking and must remain plastic under varying degrees of temperature. In other words, it must combine with and become an integral part of the surface it is designed to protect. Above all, however, it must contain in itself only such elements as will remain neutral and be unaffected by the chemicals, in either their pure or diluted form, with which it will be brought in contact. In addition it must exert no harmful effect upon the surface to which it is applied.

Acids may be roughly divided into two classes—organic and inorganic, and the chemical reactions of the various acids comprising these two classes with the different elements entering into the composition of the wide range of materials used in construction work, are so numerous and varied that

the problem of designing one single coating to fulfill all the necessary conditions is a complicated if not impossible one.

Certain elements that are unaffected by certain other elements under certain conditions will be very unfavorably affected by those same other elements under certain other conditions. Materials that will resist organic acids are usually impotent against the action of stronger inorganic or mineral acids

The one liquid coating that is least affected by inorganic or mineral acids, which are the most destructive of all in their action upon the greater proportion of materials entering into building construction, is pure refined bitumen. Yet this material is practically entirely ineffective against oils, which are its natural solvents.

A refined bitumen coating is most effective when it is used in its natural state. To be applied it must be melted and brushed on hot. It is fairly effective when manufactured into a paint and

brushed on cold but the addition of the volatile vehicle necessary to keep it in paint form decreases the body of the film that subsequently remains in the surface, thereby proportionately diminishing the quantity of the protective element interposed between the acid and the surface to be protected. The main objection to its use, in most cases is the black appearance it gives to the finished surface, but the few coloring pigments that are not destroyed by the bitumen itself, and can therefore be used to color it, are very susceptible to the action of chemicals and would therefore detract from the powers of resistance of the bitumen coating.

A coating to resist the action of organic acids and very dilute solutions of certain of the inorganic mineral acids can be produced from combinations of elements other than those contained in bitumen, with the result that such coatings are practically colorless and do not materially change the finished appearance of the surface to which they are applied.

The only practical coating to counteract the action of oils upon certain materials entering into building construction is one composed almost entirely of metallic elements. Oil enters into the composition of nearly all coatings designed for the before mentioned purposes and it will, therefore, when in contact with such coatings soften them by combining with the oils they contain thereby detracting from their immunity.

The problem therefore resolves itself into the necessity for the use of what may be called three classes of coatings to be used for the protection of the finished surfaces of the materials entering into building construction used for either—

Industrial and manufacturing purposes,
Storage of natural products,
Storage of manufactured products,
Hospitals,
Laboratories,
Dairies.

These three classes may be grouped as protective coatings against the action of—

Organic acids and fumes,
Very dilute inorganic or mineral acids and fumes.
Inorganic and mineral acids and fumes,
Oil.

GF Acid-Proof Coatings

After extensive research, analysis and experiment, the Preservative Products contained in the line of GF Waterproofing and Preservative Products have been compounded and found by actual use to be the best coatings to use for the different purposes and under the conditions enumerated in the following table:

To Protect Against:	Protective Agent:
Acetic Acid	GF 99 or GF 220
Alcohol	GF 99
Alkalies	GF 99
Alum	GF 17 applied hot
Ammonia	GF 17 applied hot or GF 99
Blood	GF 99
Caustic soda 50% solution	GF 99
Disinfectants	GF 99
Ensilage	GF 99
Hydrofluoric Acid	GF 17 applied hot
Hydrochloric Acid	GF 17 applied hot
Hydrochloric Acid 25% solution	GF 99
Lactic Acid	GF 99 or GF 145
Live Steam	GF 99
Malic Acid	GF 99 or GF 145
Mineral Acids and dilutes	GF 17 applied hot or GF 220
Molasses	GF 99 or GF 145
Nitric Acid	GF 17 applied hot
Oil	GF 140 (special)
Picric Acid	GF 17 applied hot
Picric Acid, weak solution	GF 99
Septic fluids	GF 99
Sewage	GF 99
Smoke	GF 99
Sodium Chloride	GF 99
Sugar	GF 99 or GF 145
Sulphuric Acid	GF 17 applied hot
Tannic Acid	GF 99
Wine	GF 99

All of the above GF Products are strictly neutral in their action upon the compounds they are used to withstand and will in no way affect the character, taste or appearance of such compounds.

GF 17 and GF 220 are black, GF 17 is refined

bitumen 99.64% pure and GF 220 is a paint composed of the same bitumen with a volatile vehicle that carries the bitumen into the surface and evaporating leaves the bitumen as a film upon the surface to be protected. GF 99 and GF 145 are practically colorless.

GF Acidproofing (GF 99)

GF Acidproofing (GF 99) is a colorless coating, which when applied to a cement, brick, plaster, wood or metal surface, closes it completely against the action of organic or dilute acids, smoke or alkali solutions or gases. It is chemically neutral, forming a durable film on the surface to which it adheres, but in no way reacts with it. GF 99 can be applied to either plain or colored walls and floors, metal or wood trim, rendering the surface proof against such acid and destructive agencies without altering its appearance.

After applying GF Acidproofing, it is necessary for the surface to cure or dry for 4 days before using.

Covering Capacity

First coat 350 sq. ft. per gallon.
Two coats, approximately 200 sq. ft. per gallon.

Shipped in

1 gallon cans
5 gallon cans
30 gallon half-drums
50 gallon drums.
Shipping weight, 9 $\frac{3}{4}$ lbs. per gallon.

Labor Cost

One man can apply 4 gallons per day.

GF Bitumen Coating (GF 17) and GF Brush Coating (GF 220)

GF Bitumen Coating (GF 17) is a refined bitumen analyzing 99.66% pure. It is melted and applied hot with a mop or brush.

GF Brush Coating (GF 220) is a paint composed of the same bitumen which is applied cold with a brush.

Covering Capacities

GF 17 One coat 20 sq. ft. per gallon.
GF 220 Two coats 50-65 sq. ft. per gallon.

Labor Cost

Two men can apply 200 gallons GF 17 per day.
One man can apply 25 gallons GF 220 per day.

SPECIFICATIONS

for Applying GF Acidproofing (GF 99)

1—Material

GF Acidproofing (GF 99), as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from the manufacturers or their authorized agents, and is to be delivered on the building site in the original sealed packages. It must be applied as received, without addition or adulteration of any kind, except as directed.

2—Preparation of Surface

All surfaces shall be carefully pointed and wire brushed so as to remove any loose particles and foreign matter.

If there is any grease or dirt present, the surface shall be scrubbed with benzine so as to remove this matter and leave the surface in a perfectly clean condition.

3—Application

After the surface has been cleaned of all foreign matter and is absolutely dry, apply not less than two coats of GF 99, brushing it in thoroughly so as to insure the covering of the entire surface and the penetration of the material as far as possible.

4—Treating Floors

If the floor surface is very dense and hard, the first is to be 50 % pure spirits of turpentine and 50 % GF 99; the second coat is to be 25 % pure spirits of turpentine, 75 % GF 99, and the third coat, straight GF 99.

(Note—Unless the floor is very dense in surface or texture, the spirits of turpentine is to be omitted from the second coating.)

5—Tinted Walls—Protecting

After (name walls) are coated with GF Brick and Cement Coating (GF 101) and that coating has cured 24 hours, apply a thorough coating of GF Acidproofing (GF 99), following Paragraphs 1 to 3 carefully.

Shipped in

GF 17 in 50 gallon drums
GF 220 in 1 gallon cans
GF 220 in 5 gallon cans
GF 220 in 30 gallon half-drums
GF 220 in 50 gallon drums.

SPECIFICATIONS

For Applying GF Bitumen Coating (GF 17) and GF Brush Coating (GF 220)

Paragraphs 1 and 2 to be carefully followed.

6—Application

Apply one liberal coating of hot No. 17 or two coats of GF 220, as the case may be, taking care that the film fully covers the entire surface.

The surfaces shall not be subjected to the action of the acid fumes until the coating is set dry and hard.

GF Crystalrox (GF 145)

An application of GF Crystalrox (GF 145) will protect masonry and floors from weak solutions of organic acids and fumes.

It is applied in two coats with an interval of 24 hours between each, as follows:

First coat, 2 lbs. of GF 145 to 1½ gallons of water.
Second coat, 2 lbs. of GF 145 to 1 gallon of water.

Covering Capacity

Two coats 80-100 sq. ft. per lb.

Shipped in

14 lb. cartons.

Labor Cost

One man can apply 28 lbs. per day.

STAINPROOFING LIMESTONE

The surface of the stone shall be clean of all stains and foreign matter and perfectly dry before application is commenced. GF 145 shall be applied in 2 coats of the proportions above specified, with a sponge, care being taken to get a thorough saturation.

Any excess material that is not absorbed at the end of five minutes shall be wiped off, as this material has not come in contact with the lime and will be of no use as a protection to the stone.

NEW PLASTERED WALLS

Where it is desired to decorate new plastered walls immediately, a treatment of 2 lbs. of GF 145 and 1 gallon of water shall be liberally brushed on and allowed to dry thoroughly—this has the effect of neutralizing the causticity of the surface, thereby permitting of a paint coating immediately after the drying out of the treated surface, and is a sure preventive of saponification when linseed oil paint is used.

Protecting Structural Steel

THE composition of a coating for steel must be such as to overcome the several strongly disintegrating influences to be encountered.

The first of these is the action of the alkali in cement which comes in contact with the steel coating. It must be especially compounded to retain its waterproofing value, for where cement reaches ordinary oil paints, it soon destroys the oil, leaving only a cracked and ineffective pigment adhering to the metal.

The second influence is that of electrolysis, caused by stray electric currents finding their way to the steel through cracks in the coating containing moisture. Unless the film remains intact over the whole surface, expanding and contracting with the steel without cracking, it cannot be considered a dependable coating.

GF Steel Coating (GF 300)

GF 300 Steel Coating is designed especially for structural steel. When brushed thoroughly over the entire surface it forms a tough, adhesive film impervious to water, acids and alkali, and insulates the steel from electricity.

Its co-efficient of expansion has been made exactly the same as that of steel, eliminating any danger of cracking or scaling off upon the expansion and contraction which naturally takes place.

In the composition of GF 300 the constituents are selected also to insure adhesion, and to be strongly rust preventive. It forms a heavy, lustrous and weatherproof coating.

Made in five colors as follows: Black, Gray, Green, Red and Brown.

Covering Capacity

First coat, 200 sq. ft. per gallon.
Second coat, 200 sq. ft. per gallon.
Two coats, 100 sq. ft. per gallon.

Shipped in

1 gallon cans
5 gallon cans
30 gallon half-drums
50 gallon drums
Shipping weight, 11¾ lbs. per gallon.

SPECIFICATIONS

For Applying GF Steel Coating (GF 300)

7—Material

GF Steel Coating (GF 300), as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from them or their authorized agents and to be brought on the work in the original packages and applied without addition or adulteration.

8—Cleaning the Steel

All steel before coating shall be carefully wiped to remove all moisture and oil and then wire brushed to remove all loose scale.

9—Application, Shop Coating

Apply a coating of GF 300, working the compound into all joints and crevices before riveting the parts together. A second coat shall be applied after the steel sides are riveted, and before removal from the shop.

10—Field Coating

After erection, all foreign matter that may have attached itself to the steel during the transportation and the time it was laying on the job shall be carefully removed, either by wiping or other means.

After the steel has been cleaned as above specified, all abraded surfaces shall be retouched with GF 300 and the entire surface given a finish coat of GF 300 of the desired shade.

Protecting Masonry-Embedded Steel

WHEN structural steel is to be embedded in concrete or other masonry, the final protective coating can be a less expensive material than the shop coat generally applied. If it covers the steel thoroughly, adheres to it in a strong water and alkali-proof film and will expand or contract without cracking, the protection will be sufficient.

GF Protective Coating (GF 325)

GF 325 is manufactured as a final protective coating to be used over a shop coat such as GF 300. Its constituent parts are fused together at great heat to prevent disintegration by the lime in cement or cement grout and keep the coating permanently elastic.

The resulting protective film is tough, impervious to water and the alkalies present in green masonry, and can be depended upon to expand and contract with the steel without cracking. It is also a sufficient insulator to prevent any disintegration by electrolysis.

Covering Capacity

First coat. 200 sq. ft. per gallon.
Second coat. 200 sq. ft. per gallon.
Two coats. Approximately 100 sq. ft. per gallon.

Shipped in

1 gallon cans
5 gallon cans
30 gallon half-drums
50 gallon drums
Shipping weight, 9½ lbs. per gallon.

SPECIFICATIONS

For Applying GF Alkali Coating (GF 325)

11—Material

GF Alkali Coating (GF 325), manufactured by The General Fireproofing Company, Youngstown, Ohio, must be purchased from the manufacturers direct or from their authorized agents, and must be delivered on the building site in original and sealed packages and applied without adulteration or addition, according to the following instructions:

12—Application

Immediately after erection the steel is to be closely examined to ascertain whether the shop coating has suffered any damage in transportation or erection. If such is the case, re-coat such portions as have been damaged, with GF 300. After allowing this supplementary coating to become thoroughly dry, apply the finishing coat of GF 325, brushing same evenly and thoroughly so that the surface will be smooth and continuous.

13—Caution

Before the different parts are placed they should be carefully inspected to see that they are all thoroughly covered with GF 300.



Tod House, Youngstown, Ohio. GF 300 Steel Coating and GF 325 Protective Coating (for steel) used. Knox & Elliot, Cleveland, Ohio, Architects. Heller Bros., Youngstown, Ohio, Contractors.

Protecting Galvanized Iron, Tin or Zinc

THE wide use of galvanized iron, tin and zinc in building has created a demand for a paint or coating which can be used successfully on these materials. The chief difficulty in the past has been the lack of proper adhesion, most paints scaling off after a short time. This is due to a grease-like film formed during the galvanizing process. A coating which does not penetrate this film will soon scale off, while one which destroys the film is injurious to the metal itself.

GF Galvanized Iron Coating (GF 350)

In compounding GF 350 the aim has been to overcome this difficulty by combining a strongly adhesive element with one which would penetrate the film without destroying it. This gives the GF 350 coating a firm grip on the iron, zinc or tin and prevents scaling. At the same time there is enough elasticity in GF 350 to keep it from cracking upon expansion or contraction of the surface to which it is applied. This coating dries quickly, and sets hard, forming a strong, rust-inhibiting covering with exceptional wearing qualities and of an even color throughout.

GF 350 is used for painting galvanized iron, tin or zinc materials, such as gutters and leaders, roofing and siding, etc. As a special precaution it is good practice to paint the under side of roofing and siding thoroughly with GF 350 before putting them in place. This is a point often neglected in building which causes a great deal of trouble in later years, for moisture collecting on the under side quickly rusts the unprotected metal. The increased cost is not heavy, as the parts may be coated on the ground before being put in place.

The coloring pigment in GF 350 is mixed to form a smooth coating which is easily and evenly applied. Colors are carried as follows: White, Black, Red, Brown, Gray and Green.

Covering Capacity

First coat.....	275 sq. ft. per gallon.
Second coat.....	325 sq. ft. per gallon.
Two coats.....	150 sq. ft. per gallon.

Labor Cost

One man can apply 5 gallons per day.

Shipped in

- 1 gallon cans
- 5 gallon cans
- 30 gallon half-drums
- 50 gallon drums
- Shipping weight, 10 lbs. per gallon

SPECIFICATIONS

For Applying GF Galvanized Iron Coating (GF 350)

14—Material

GF Galvanized Iron Coating (GF 350) as manufactured by The General Fireproofing Company, Youngstown, Ohio, is to be purchased direct from them or their authorized agents and must be brought to the building site in original packages and applied without addition or adulteration.

15—Preparing Surfaces

Before any coating is applied the surface of the metal shall be cleaned of all particles of foreign matter, such as mortar, plaster, other kinds of paints, etc., washed with benzine and shall be absolutely dry.

16—Application

After the foregoing conditions have been complied with, a thorough covering coat of GF 300 (of the desired color) is to be applied. The coating must be thoroughly worked into all seams and joints and around all rivet heads.

When the first coat has cured for 24 hours, a second coat of any desired shade shall be applied in the same careful manner.

17—Back Coating

Before erecting, all sheets for roofing, siding, etc., shall be thoroughly coated on the back or unexposed face with 2 coats of GF 350 applied in accordance with Paragraph 16.



Home Savings and Loan Co., Youngstown, Ohio. GF Protective Coating (GF 325) used for structural steel. Architect, Charles F. Owsley, Youngstown. Contractors, Heller Bros. Co.

Bonding New Concrete to Old

THE problem of bonding new concrete to old occurs both in repairing or adding to old concrete, and on new construction where each day's work must be joined to the next.

In applying waterproof cement mortar, also, perfect adhesion is indispensable to effective work and depends upon the solidity of bond.

The old surface is prepared for bonding by such mechanical means as scouring, hacking and wire-brushing, but these methods are insufficient alone for they do not always expose the aggregate. The real obstacle to a perfect joint, in any case, is a thin, glassy cement film which forms on the surface of concrete and sets with particles of dust and dirt firmly embedded in it. To secure a dependable bond, this hard film and all foreign substances must be removed from the old surface so that the aggregates are exposed for active union with the new concrete.

GF Bonding Compound (GF 400)

GF 400 is put up in the form of a powerful acid powder to be dissolved in water and applied to the surface of the concrete. It effervesces immediately, removing the film and all foreign material and exposing the aggregate of the concrete ready for joining with the new work.

In preparing GF 400, every precaution has been taken to prevent injuring the strength or durability of the concrete to which it is applied. In fact, tests show that concrete bonded together in this way and tested to destruction, breaks more quickly at any other point than at the point of joining.

Treatment of an old or set up concrete or cement surface with GF 400 Bonding Compound will give a bond of 80 lbs. per square inch of surface between the old surface and the new work.

This is especially valuable in waterproofing work, as it will bond new and old concrete perfectly, making it absolutely monolithic. In the case of Portland cement plaster coat waterproofing, applied to the interior of a basement and to waterproof against pressure from the outside, it will bond the new work to the old construction so that it will resist a water pressure of 11,520 lbs. per square foot of surface, which is equivalent to 184 feet of hydrostatic pressure.

GF 400 applied over the surface of concrete arches, or over an old cement floor, will give a perfect monolithic bond between the new floor topping and the old surface.

GF 400 is put up in five-pound jars and packed 12 jars to the case. Two pounds dissolved in one gallon of water will treat from 100 to 150 square feet of concrete, varying according to the porosity of the surface.

NOTE:—After the GF 400 has completed its chemical action it must be carefully removed so that none of it remains or comes in contact with the new work.

SPECIFICATIONS

For Use of GF Bonding Compound (GF 400)

18—Material

The Bonding Compound used for all work shall be GF Bonding Compound (GF 400), manufactured by The General Fireproofing Company, Youngstown, Ohio, and shall be purchased direct from them or their authorized agents. It shall be brought to the building site in original packages and applied according to the manufacturer's directions.

19—Preparing Surfaces

Surfaces to be treated with the Bonding Compound shall be roughened thoroughly with a mason's chipping hammer, then cleaned with a wire brush to remove all loose particles.

20—Mixing GF 400

In each gallon of water to be used in washing the surface, dissolve 2 pounds of GF Bonding Compound (GF 400). After this has been stirred well, and gone thoroughly into solution, it may be used.

21—Application

A liberal coat of GF 400 in solution shall be applied to the rough surface, using either a broom or an acid brush. This to remain until all effervescence and chemical action have ceased.

If the first application does not completely clean the surface and expose all aggregates, apply a second coating in the same manner.

22—Washing

Directly after GF 400 has exhausted itself (after chemical action has stopped) wash down the surface by several applications of clean water, and after the surface is thoroughly saturated by this means to a point where it will absorb no more water, apply a thin cream of cement and water. Before this cream of cement and water sets and becomes hard, join on the new concrete.

(Note—If a hose is available for washing down the wall or floor this affords the best means of cleaning it readily, and also saturating it thoroughly.)

Protecting Posts, Trusses, Structural Timbers and Exterior Trim from Cracking, Dry Rot, Etc.

Cracking and splintering of structural members, trim, etc., exposed to the atmosphere is caused by the drying out and rotting away of the natural saps that cement the wood fibres together. Such results are caused by alternation of heat and cold, dryness and dampness and can be prevented or stopped by treating with GF Wood Preservative (GF 160), a transparent coating that fills the pores and combines with the saps to form a tough, rubbery fill that is unaffected by dampness or atmospheric changes.

GF Wood Preservative is applicable to any kind of hard or soft wood and will cover from 400 to 500 sq. ft. per gallon depending upon the porosity.

Shipped in

- 1 gallon cans
- 5 gallon cans
- 30 gallon half-drums
- 50 gallon drums
- Shipping weight, 8½ lbs. per gallon

Labor Cost

One man can apply 15 gallons GF 160 per day.

23—Specifications for Applying GF 160 to Structural Timbers and Trim

All structural timbers and trim shall be perfectly dry and cleaned of all dirt, dust, paint or mortar and then receive 1 coat of GF Wood Preservative (GF 160) liberally brushed into the pores.

Protecting Timbers Embedded in Masonry or Earth

Timbers embedded in masonry or earth, sills and ends of beams in brick or concrete walls, beams and sleepers of wood floors laid on the ground are susceptible to dry rot and disintegration of the saps due to dampness or alternating dry and damp conditions.

GF Timber Preservative (GF 550) is a combination of creosote, zinc salt and copper, that penetrates the pores, and combining with the sap enables the latter to resist the attacks of dampness, oils, insects, fungi and other causes that would rapidly destroy it.

Covering Capacity

- 100 sq. ft. of rough surfaces per gallon.
- 200 sq. ft. of smooth surfaces per gallon.

Shipped in

- 1 gallon cans
- 5 gallon cans
- 30 gallon half-drums
- 50 gallon drums
- Shipping weight, 10 lbs. per gallon

Labor Cost

One man can apply 15 gallons GF 550 per day.

24—Specifications for Applying GF Timber Preservative (GF 550)

All timbers embedded in masonry, all sills, ends of beams in brick or concrete walls, beams and sleepers of wood floors laid above earth, shall receive a good brush coating of GF Timber Preservative (GF 550), care to be taken that all the surfaces are thoroughly and evenly coated with the GF 550



INDEPENDENCE HALL, PHILADELPHIA, THE KEEPSAKE OF THE NATION

The roof trusses of this venerable structure were recently found to be in danger from dry rot. A treatment of GF 160 has been used to preserve them.

Waterproofing and Hardening Cast Stone Cement Blocks, Etc.

The use of GF Integral Waterproofing Paste (GF 10) or GF Waterproofing Powder (GF 11) in cast stone blocks, caskets, or furniture, protects the surfaces against deterioration and discoloration by water and weather.

In the case of GF 10 it requires one-sixth of a gallon (about 1½ lbs.) to waterproof one bag of cement and is dissolved in the water used for wetting up. The quantity of water used per bag of cement varies in different classes of work so it is first necessary to determine what this quantity is and then dissolve in it the necessary quantity of GF 10. Usually 1½ gals. of water are used per bag of cement in which case the proportion would be 1 part of GF 10 to 9 parts of water by volume as GF 10 weighs the same as water.

In the case of cast stone it is only necessary to use the waterproofing in the finish coating.

Where the ingredients are first mixed dry in a mill GF 11 is used, in which case it requires 2 lbs. of GF 11 per bag of cement. This is to be first mixed with the dry cement and then the aggregate and water added.

The use of GF 10 or GF 11 tends to very considerably whiten the finished appearance of the work.

By using GF Cement Accelerator (GF 12) the setting of the cement is very materially hastened. It also waterproofs and hardens the surface and corners so that the product is set up and hard in 2 days, and can be handled without danger of chipping.

GF 12 is colorless and does not affect the finished appearance and is put in the water used in wetting up the aggregate in the proportion of 1 gal. of GF 12 to 7 gallons of water.

For cast stone, etc., that has already begun to show the effects of water and weather conditions, GF 100 Colorless Waterproofing applied to the surface will render same waterproof without changing its appearance.

GF 100 is applied in 2 coats with a brush, an interval of 24 hours being allowed between coats.

The surfaces must be dry and all cracks, open joints, etc., scraped out and pointed up with GF 250 elastic cement. GF 100 will cover 100 sq. ft. per gallon, 2 coats.

1 man can apply 5 gallons GF 100 per day.

Rendering Concrete Tanks Oilproof

Concrete tanks intended for the storage of oils require an interior treatment to prevent the corrosive action of the acids in the oils upon the cement and for this purpose GF Oilproofing (GF 140 Special) is infallible. It is applied in the form of a plaster coat to the floor and inside faces of the walls.

It requires

¾ lb. of GF Oilproofing (GF 140 Special) per sq. ft. of surface.

Shipped in

100 lb. bags.

Labor Cost

1 man with helper can cover 300 sq. ft. of surface per day.

SPECIFICATIONS

For Applying GF Oilproofing (GF 140 Special)

25—Material

GF Oilproofing Compound (GF 140 Special) as manufactured by The General Fireproofing Company, Youngstown, Ohio, shall to be delivered at job in original packages.

26—Proportions

The oilproofing plaster coat shall consist of one part of Portland Cement to which has been added 33 1-3% by weight of GF Oilproofing Compound and one and one-half parts of clean, well graded siliceous sand.

27—Mixing

The GF 140 shall be mixed dry with the Portland Cement in the proportion of 33 pounds GF 140 to each bag of Portland Cement mixed thoroughly to an even uniform color. The Portland Cement containing the dry mixture and 33 1-3% of GF 140 shall then be thoroughly mixed dry with one and one-half parts, by volume, of sand and then tempered with water to proper consistency for plastering.

28—Treatment of the Surface to be Coated

(a) The surface shall be mechanically roughened by chipping and very thoroughly cleaned with a heavy wire broom, so as to remove all dust and dirt. Steam may be employed if available.

(b) To the mechanically cleaned surface apply with a brush, a generous coat of GF 400 diluted, 2 lbs. to every gallon of water. Allow the GF 400 to remain until it has exhausted itself, which will require at least twenty minutes. Apply a second coat of GF 400 solution if the first does not sufficiently clean and expose the surface of the aggregate.

(c) Wash the surface so as to remove loose particles until the old concrete is thoroughly cleaned and soaked to its full capacity, and thoroughly wire brush the surface.

(d) Apply with a strong broom a coating of pure cement mixed with clean water to a thick, creamy consistency. Rub in thoroughly so as to fill all crevices and cavities.

29—Application of Plaster Coat

Before the slush coat of cement and water sets, apply the GF 140 Oilproof Cement Plaster, prepared as above, to a thickness of ½" directly on the slush coat and trowel thoroughly into all the crevices of the surface to a smooth finish free from all defects.

30—Treatment of Finished Surface

As soon as the GF 140 Oilproof Plaster Coat has taken its final set, it shall be liberally wetted with water and kept moist and damp for a period of a week or ten days to provide for thorough hardening and prevent too rapid drying out that would likely cause shrinkage.

Other GF Products

BESIDES Waterproofing Products, we manufacture fireproof building products such as are essential to the best concrete, stucco and plaster construction. Each product represents the evolution of years of scientific study and experimentation. Each stands for the three GF virtues—speed in erection, economy in cost and upkeep, and permanence.



HERRINGBONE RIGID METAL LATH

Herringbone is the stiffest metal lath made. As a base and reinforcement for plaster partitions and stucco, for fire resistance and permanence, it has no equal.



KEY EXPANDED METAL LATH

Although used on all classes of work—walls, partitions and ceilings—it is especially adapted to lathing domes, wrapping beams, columns, and for ornamental plastering as the mesh is uniformly pliable and readily lends itself to odd formations.



SELF-SENTERING

Self-Sentering is a combined reinforcement and centering for roof, floor and wall concrete construction—a one-piece lath and stud—a self-furring lath.



TRUSSIT

Trussit is a corrugated, expanded sheet which forms the base and reinforcement for plaster walls and partitions. It eliminates the use of studding. Partitions need be but two inches in thickness, as it is not a mere backing for plaster but the partition itself.



GF DIAMOND RIB LATH

A new self-furring lath providing light weight and exceptional rigidity with economic plastering quality. Used especially in Steel Tile and Steel Lumber construction for suspended ceilings and other places requiring lath capable of spanning greater distances than 16".



GENFIRE SHEET STEEL LATH

Used for all classes of plastering work, partitions, ceilings and exterior stucco. Rapidity with which it is erected and plastered, and the small amount of plaster required make it an inexpensive form of metal lath construction.



GF STEEL LUMBER

High quality basic open hearth steel rolled from a slab to the finished products under strict supervision and inspection. For use as joists and studs in floor and partition construction.



GF EXPANDED METAL

For a wide variety of uses in reinforced concrete construction as concrete floors, for sewers, conduits, water pipes, fireproofing steel beams, etc. Smaller meshes used for machine guards.



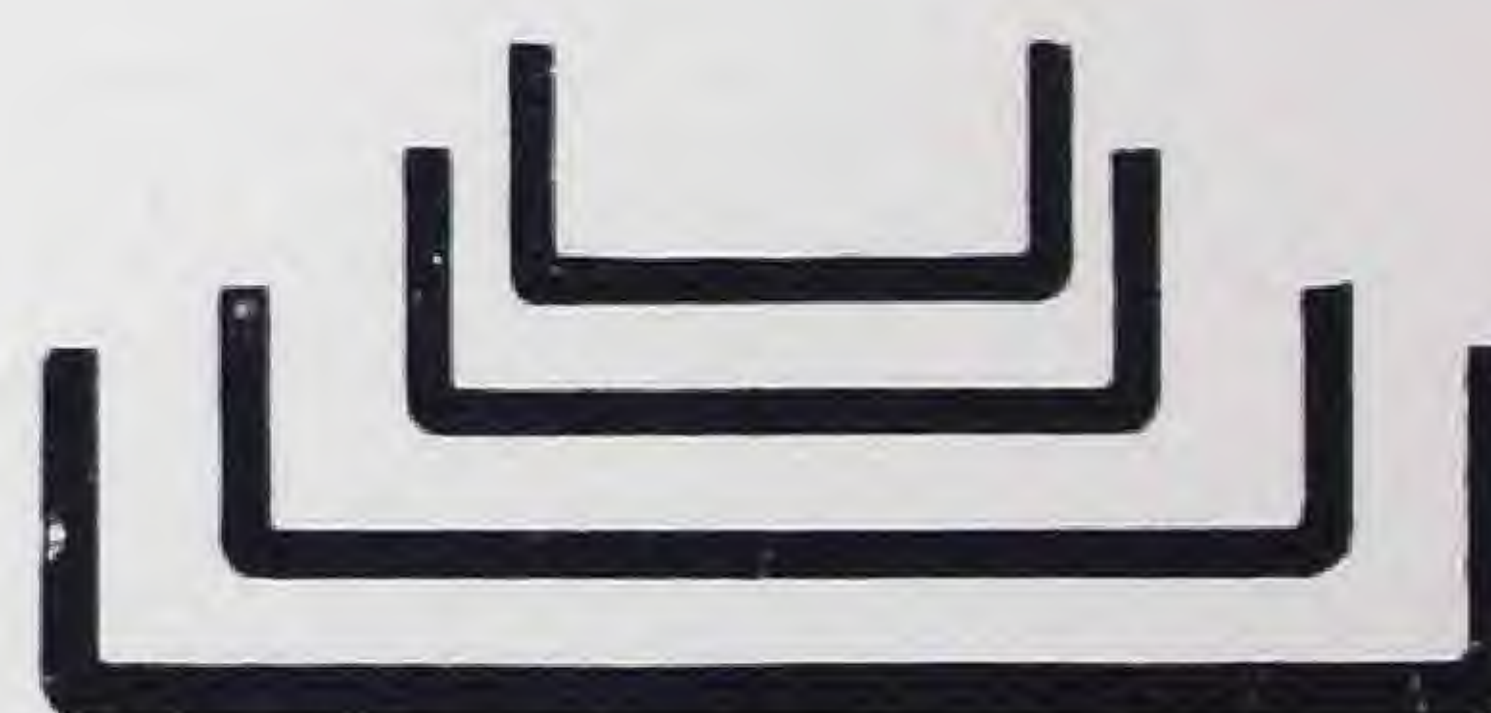
GF STEEL TILE

Light steel forms of various depth for use with reinforced concrete in floor construction—saves labor and material and facilitates rapid construction.



GF CORNER BEAD

A permanent and secure protection against broken wall corners when fastened to the corner framing or lath and imbedded in plaster. Used on walls of tile, gypsum block, wood or metal lath.



GF COLD ROLLED CHANNELS

For use as furring on suspended ceilings, false beams, columns or corner work, on masonry walls, for solid or hollow metal lath partitions.



GF PEDS

GF Peds are "spot grounds" for the attaching of wood or metal trim to walls, and sleepers to concrete floors. They supplant the old-fashioned methods which were costly in time labor and material.

